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The Railway's Interest in Correct Weight

The correct determination and recording of weights is a matter of direct concern to the shipper as well as to the railway, and this subject was a topic of active discussion among various shipper's organizations previous to the recent Interstate Commerce Commission hearings on this subject. Mr. Maegley's plea for less secrecy with reference to weights, calling every weight by its right name, and for the participation of the carriers in the determination of the weights of the receiver and the shipper is therefore of general interest to the patrons of the railways as well as to the railways themselves. Unless there is co-operation between the shipper and the receiver of grain and the railways, it is very difficult to locate and correct discrepancies. It would seem that they can best be discovered and corrected by the carrier, since it is a neutral intermediary between the shipper and the receiver. In the reduction or elimination of any class of claims for losses it is first necessary to make a diagnosis of their causes. Only by some joint co-operation, such as that suggested can the proper analysis be made. It is to the ultimate interest of all concerned that legitimate claims be reduced to the minimum, for money paid for the payment of such claims is an economic loss from which no one benefits. Joint committees representing the grain dealers and the railways are now studying this subject and it is to be hoped that their deliberations may result in the evolution of some practicable plan whereby legitimate claims may be reduced to the minimum and others made impossible.

Foreign Government Short Term Financing

Both France and Germany and some of the neutral countries have successfully bid for American short-term money. In recent years the American railroads have been heavy bidders for short-term money at continually advancing prices. It has been recognized, however, both by the railroad managements and the bankers that railroad financing by means of short-term notes was a temporary and an uneconomical expedient. Within the next few years, therefore, American railroads will, both for purposes of meeting maturing short-term notes and for new capital, have to sell a very large amount of long-term bonds and will have to sell them almost exclusively in the American market. Any short-term financing which railroads are compelled to do at present is in competition with the short-term financing of the European governments. Will the long-term bonds of American railroads have to be sold in this country in competition with long-term bonds with which the European governments will meet the maturing notes which they are now selling over here? The proceeds of the sale of foreign government notes are not, of course, leaving the United States, but are being used by the belligerents to pay for war supplies, and by the neutral countries to pay for foodstuffs. There is no gold being exported from the United States to Europe, but foodstuffs and manufactured materials are being exported. This, of course, is a transfer of wealth for which the United States reecives credit. When the short-term European notes fall due the European governments will have the choice either of attempting to sell long-term bonds in the United States to American investors or of selling their bonds to their own investors. In the latter case there will necessarily have to be a transfer either of gold or of some form of wealth from Europe to America to liquidate the debts which Europe is now contracting. Europeans hold a very large amount of American railroad securities. The European investor could ship back to America American railroad securities, thus liquidating the European debt to America, and take in exchange European government bonds. American investors would then be called on to take not only the American railroad securities which were issued to refund short-term notes and to raise new capital, but also the old securities which had been sold in Europe.

Government Versus Railway Securities

Of course, the extent to which the foreign investor sells his holdings of American railroad securities in order to buy European government bonds will depend in part on inducements in the way of interest, security, etc., which the European government bonds will hold out to investors, but also in part to the security of American railroad bonds and their attractiveness as an investment. It might well be that an English or French holder of first mortgage bonds of a strong American railroad company would prefer to retain these bonds even in the face of an offering of European government bonds with a comparatively high rate of interest, but this could only conceivably be so if American railroad credit as a whole were to be much higher in

a year or two from now than it has been in the last few years. On the other hand, the price at which American railroad refunding operations and the raising of new American railroad capital can be accomplished will depend directly on whether or not the two to four hundred million dollars of American railroad securities now held in Europe are dumped on the American market. In other words, it apparently behooves the American railroad managements to be fore-handed in preparations for meeting competition for new capital. To successfully improve railroad credit railroad managers must under our present form of government have the active co-operation of the Interstate Commerce Commission, and although the co-operation of state commissions is hardly to be hoped for, yet there must be a minimum of opposition on the part of these railroad regulators. Railroad managements and the bankers handling their securities will have to make a strong bid for the confidence of investors; but the investors' attitude will be very materially affected by that of the Interstate Commerce Commission and of national and state legislatures. There is, therefore, a vital need for mutual confidence as between railroad managers and railroad regulators and the public.

A SECRETARY OF TRANSPORTATION

FROM different sources there has come recently the suggestion that the industry of transportation should be given representation in the President's cabinet. Ray Morris, in an article in the Yale Review, and Chairman Elliott of the New Haven, in an address at Norwich, Conn., have pointed out the desirability of such action.

Labor has recently been given representation in the cabinet by the creation of the office of secretary of labor. The three greatest industries in the country are agriculture, manufactures and transportation. Agriculture is given representation through the secretary of agriculture, and manufactures and commerce are given representation through the secretary of commerce. The secretary of the treasury, to a large extent, represents the banking interests. Not only is railway transportation one of the three great industries of the country, but in its magnitude it is a peculiarly American industry. The largest railway mileage in any country in the world, except in the United States, is in Russia, which has 50,000 miles; and the mileage of the United States is five times that of Russia. The mileage of the railways of the United States largely exceeds that of all the railways owned by governments in the world. In no other country has railway transportation been developed to such a magnitude either absolutely or relatively, and in no other does the prosperity of the public depend to so great an extent on the prosperity and progress of railway transportation. Yet, while we have secretaries of labor, of commerce, of agriculture and of the treasury, and while many other countries have ministers of railways, the railway industry of this country is conspicuously unrepresented in the President's cabinet.

What is the explanation of this condition of affairs? The functions of the secretaries of labor, of agriculture, of commerce and of the treasury, are wholly in some cases and largely in others, to promote the welfare of the classes or the industry which they represent. Congress thought that by having special government departments to promote the welfare of the laboring class and of the agricultural, manufacturing, commercial and financial interests, the welfare of the public in general would be furthered. But, by some peculiar process of reasoning, it concluded that in the case of the railway industry, what was needed was not a governmental policy of encouragement, but a governmental policy of regulation and repression. It thought it would be advantageous to the public for the other large industries to make large profits, but that it would be advantageous to the public for the profits of the railways to be narrowly restricted. The state legislatures have thought the same way; in fact, the public has thought the same way. Consequently, for years the federal government has been following the policy of fostering other industries and regulating, and repressing the railway industry. It has tried to fix a minimum for the prosperity of other industries and a maximum for the prosperity of the carriers. The effects on the public welfare have not been good. The policy of railway repression has not only injured the railway industry, but has reacted unfavorably on all other classes of industries and tended to counteract the effects of the government's attempts to foster them.

The railways ought to continue to be regulated. The Interstate Commerce Commission should be maintained and should continue to arbitrate between the shippers and the railways regarding rates, and perhaps it should arbitrate between the railways and their employees regarding wages. But, as has been done in the cases of other industries, there should be created an administrative department of the government whose function it should be to study the railway industry and its needs sympathetically and to try to foster its development. Perhaps to this administrative department should be transferred a large part of the administrative duties now performed by the Interstate Commerce Commission. But the primary, fundamental duty of the proposed department should be to foster the industry and not to restrict burden and oppress it.

The public is awakening to the fact that it does not pay any class or classes for the railways to be treated as if they alone among all the great industries are a proper object for attack and repression. Perhaps therefore the time is now ripe for the creation of an administrative department of the government devoted to the interests of transportation.

THE ROCK ISLAND'S FINANCING AGAIN

THE Chicago, Rock Island & Pacific was placed in the hands of receivers on Tuesday. The immediate cause of the receivership was the unwillingness of the directors or bankers to personally extend further aid to the company to help it meet its May 1 interest charges without some assurance that they would not have to continue to carry the company indefinitely. They had already personally helped the road out of its April 1 difficulties.

It has been apprehended for a long time that the condition of the Chicago, Rock Island & Pacific Railway Company would become so serious as to result in its being placed in the hands of receivers. The Railway Company, it should be understood, is the underlying operating company and not either of the two holding companies. The net earnings of the company and the dividends paid by it have been declining while its taxes, interest and other outgo have been increasing. In 1914 it had a deficit of over $1,400,000 and its case seemed hopeless. After the recent annual meeting the outlook seemed more hopeful but the receivership so long feared has at last come both suddenly and unexpectedly. The company found it was unable to get the bankers to let it have certain money which it expected to raise and this rendered it unable to meet certain debts which would soon become due.

The *Railway Age Gazette* recently has published several editorials on the Rock Island situation. A correspondent whose friendship it long has valued, and whose good opinion it desires to deserve and retain, has written chiding us for the editorial entitled "The Chicago, Rock Island & Pacific—1902 to 1915," published in our issue of April 9. He finds the editorial not at all convincing as an argument that the financial operations of the Rock Island "are defensible even in their intentions, which, from my reading of the article, I judge you to defend." He says that the property was capitalized entirely beyond its earning capacity, and that it seems to him that "any argument that tries to defend this procedure on a technicality weakens the whole case of all honest and wise railroad managers." He adds, "Your defense, or what appears to be your defense, of these operations certainly very much weakens the influence that your arguments will have with one of your readers, and it seems to me that it must weaken the influence that your arguments will have with other readers."

Since our correspondent interprets the editorial he criticizes

as a defense of the financing of the Rock Island, we are not surprised that it tends to weaken the influence that our arguments have with him. If other readers place the same interpretation on it, it will doubtless tend to weaken our influence with them also. But such an interpretation is erroneous. The editorial was not, and was not intended to be, a defense of the financing of the Rock Island. No paper has more severely condemned the financial structure built up on that road by Messrs. Reid and Moore than has the *Railway Age Gazette*. That structure was built up to give a few men control of a large property by means of a small investment, and it ought not to be possible for the control of so large and important a property to be thus secured and held. One of the effects has been to injure the Rock Island's credit, and the injury to its credit has interfered with its needed development. The worst effect of the Rock Island financial structure was that it made it essential to the maintenance of the solvency of the holding companies that the operating railroad company should continue to earn and pay four per cent dividends. In other words it turned a contingent liability into a fixed liability, thereby rendering it impracticable for the operating company even temporarily to suspend or reduce its dividends. In consequence earnings which otherwise might have been devoted to improvements which would have increased the earning capacity of the property were paid out in dividends and the property's development did not keep pace with the development of competing railways in the same territory. There can be no serious question that if the Rock Island property had not been loaded down with one holding company after another, and had not suffered losses through the Frisco and Alton transactions, it would be a better property today, both in the service it renders to the public and in the profits it earns. The issuance of railway securities should be so regulated as to make impossible such financial transactions.

But the *Railway Age Gazette* can entertain the views above expressed, and at the same time refuse to be blinded to other facts and circumstances affecting the situation of this property besides those mentioned. The purpose of the editorial in our issue of April 9 was to point out certain of these other facts and circumstances. The main point sought to be established was that the entire financial structure was based on the hope that the road's profits would increase, or at least not decline; that, as a matter of fact, the profits had actually declined; and that this, and not the holding companies, was the *main* cause of the troubles that have overtaken the property. Are not these facts? Between 1907 and 1914 the dividends paid by the underlying company declined from $4,116,728 to $1,871,763, or $3,344,965. What was the cause of this decline? The following figures explain, and more than explain, it. Between 1907 and 1914 gross earnings increased from $60,238,420 to $68,208,113. Meantime operating expenses and taxes increased from $42,720,180 to $54,315,578. Taxes alone jumped from $1,676,000 to $3,316,000, or about 100 per cent. The result was a reduction in net operating income of $3,635,705, which substantially exceeds the reduction in the dividends paid.

The more the figures are studied the more clearly it appears that if the two holding companies had never come into existence at all it would have been impossible for the management to have offset the increases in operating expenses and taxes by any increases in the efficiency and economy of operation that were within its power.

The facts show, then, that the Rock Island has been subjected to two sets of adverse influences. One of these has grown out of its peculiar financing. The other has grown out of increases in its operating expenses and taxes which have caused it to suffer more severely than many other properties because it has been so situated that it has not enjoyed as large an increase as some of them in its gross earnings. Is it defending the financing of the property to call attention to the fact that the plight to which it has been brought is chiefly due, not to its unwholesome financing, but to increases in its operating expenses and taxes?

It is not the policy of this paper to defend the mistakes made or the wrongs done by railway managements. It is our policy to try to present all the facts regarding the railway situation in their true proportions. This is made the more necessary because many persons who discuss these matters seize upon and use only those facts which may support their prejudices or serve their own special purposes. The reckless and, as it has turned out, foolish financing of the Rock Island has been harped upon so much that most people have become convinced that this has been the only thing that has got the property into trouble. This persistent exaggeration of certain features of the case has made it necessary to call attention forcibly to other and equally important features, and this is all the *Railway Age Gazette* has meant to do in the editorials on the Rock Island which it has recently published.

The final bankruptcy of the property is the natural result of the operation of the two sets of influences that have been acting upon it. If the holding company superstructure had never been erected it might have had to reduce or suspend its dividend, but it would probably be a solvent property today. If on the other hand there had not been such an enormous increase in wages, taxes and other expenses it would have been able to have earned and paid sufficient dividends to support the holding company superstructure. With the two sets of influences acting on it, it was unable to continue to stand up. The outcome may properly be denounced as a natural result of the sort of financing of which the Rock Island has been the victim, but it may also with equal propriety and justice be denounced as a natural outcome of the sort of regulation to which the Rock Island and other railways have been subjected.

DELAWARE & HUDSON

THE Delaware & Hudson is generally classed with the financially strong roads of the country, and quite properly so. Even in the calendar year 1914 the company earned net income available for dividends of $4,608,000, or 10.84 per cent, on the outstanding $42,503,000 stock. The company can earn a margin of safety over its 9 per cent dividend rate in a year such as 1914, when it was adversely affected by loss of both freight and passenger business, on the one hand, and by increased operating expenses from causes beyond the control of the management, on the other, because the profit is concentrated on a comparatively small volume of stock; the company has had to pay in the past a low rate of interest for borrowed money and has pursued a liberal policy toward betterment and upkeep. The net earnings on the value of the property used in public service are not high. It was brought out in the anthracite case before the Interstate Commerce Commission that the net operating income of all of the anthracite roads, that is, the total amount available for interest charges, rentals, dividends, etc., after the payment of operating expenses and taxes, amounted to 5.06 per cent on the book cost (the actual cost was probably greater and the rate of return therefore less) of the property devoted to public use. It is so obvious that it is to the public interest for American railroads to get their new capital at the cheapest possible price, and that the reason why such a road as the Delaware & Hudson has in the past been able to do so has been that its earning power has left a fair margin of safety even in times of depression, that it hardly needs reiteration here.

Many of the adverse circumstances which affected the Delaware & Hudson's operating results in 1914 were foreseen and commented on in the annual report for 1913. Briefly summarized, these adverse circumstances were: a loss in bituminous coal tonnage of 355,000 tons, the total carried in 1914 being 2,052,000 tons; in ore tonnage a loss of 313,000 tons, the total tonnage carried in 1914 being 465,000 tons; a loss in miscellaneous tonnage of 919,000 tons, the total carried in 1914 being 715,000, all due to the business depression, the loss in bituminous coal tonnage being of course directly traceable to the shutting down of business in the New England mills and industries; a loss in passenger revenue amounting to $331,000, the total earnings from passenger busi-

ness being $2,947,000 in 1914; and increased expenses of $77,000 due to the operation of the full-crew law for an entire year as against four months in the previous year; increases in wages amounting to about $136,000, due to results of arbitration, and increases in general expenses due to valuation expenses and compliance with requests for information, etc., from the commission.

A favorable factor during the year was the increase in the tonnage of coal mined by the coal mining department, amounting to 230,000 tons, the total mined in 1914 being 7,401,000 tons. There was a loss of a little over 4½ working days in the coal mines due to strikes, as compared with about 54½ days lost in 1913. There would have been no loss of time in either year if the miners had lived up to their agreement to leave disputes to arbitration before striking. There was, as would be expected, a larger tonnage of anthracite coal shipped over the road, the total in 1914 being 9,211,000 tons, an increase of 299,000 tons as compared with 1913. Despite the larger amount of coal mined, however, the revenues from the coal mining department amounted to $15,517,000 as against $16,045,000, and net revenue amounted to $964,000 as against $1,297,000. Presumably the payment of a tax of 2½ per cent on the value of anthracite when prepared for market imposed by Pennsylvania and which went into effect on June 28, 1913, accounts for part of the loss in revenue in the face of the increased tonnage of coal mined. The company is now testing the validity of the Pennsylvania tax in the courts.

Transportation expenses in 1914 amounted to $8,603,000, comparing with $8,585,000 in 1913. The enforced increases in expenses previously mentioned in part explains why it was impossible to reduce transportation expenses proportionately to the reduction in freight and passenger business handled.

The large falling off in tonnage of ores probably also had its effect on the increased transportation expenses per ton-mile and this is reflected in the trainload figures. The revenue trainload was 518 tons in 1914, a decrease of 24.5 tons from the average in 1913, and the total trainload, including company freight, was 557 tons, a decrease of 27.7 tons as compared with 1913. Since the number of loaded cars per train was almost the same in 1914 as in 1913—20.58—and the tons of revenue freight per loaded car pretty nearly as great—25.17 as against 26.14 in 1913—the loss in ore tonnage was a considerable factor in the increased proportion of empty car mileage—this tonnage moving in the direction of the empty car movement.

In 1914 $1,670,000 was spent on maintenance of way, a decrease as compared with the 1913 expenditure of $117,000; and $3,650,000 was spent on maintenance of equipment, a decrease as compared with 1913 of $104,000. In the early part of 1914 there was some very bad weather in the part of the country traversed by the Delaware & Hudson, and the removal of snow and ice in 1914 cost $101,000 as against $18,000 in the previous year. At least a part of the smaller expenditure on maintenance of way apparently represents work more economically done, since the amount spent for rails in 1914 was $73,000 as against $41,000 the year before, and for ties, $273,000 as against $287,000, while applying track material cost but $139,000 in 1914 as against $224,000 the year before; although, on the other hand, there was $8,000 spent for ballast as against $17,000 the year before, and $85,000 spent for "other track material" as against $107,000 the year before. The smaller amount spent for betterments entailed smaller charges in expenses for "replacement in kind."

More was spent for repairs of locomotives and somewhat more for repairs of freight cars in 1914 than in 1913; but the decrease in total maintenance of equipment expenditures is accounted for by the fact that but $31,000 was charged for freight-train car renewals in 1914 as against $316,000 in 1913.

During 1914 the Delaware & Hudson spent $1,821,000 for additions and betterments. Of this, $15,635 was for the installation of block signals between Plattsburg, N. Y., and Rouses Point, and $29,950 on the program of installation of distant signals at the end of the double tracks and for passing track leading from single track line and the extension of overlaps to a minimum distance of 2,000 ft., where distant signals were not in use.

The company sold during the year $4,500,000 first and refunding mortgage 4 per cent bonds at 95. At the end of the year the company had $1,968,000 cash, as compared with $1,647,000 at the beginning of the year, and had on special deposit $1,055,000, of which all but $10,000 represents the unexpended balance from the proceeds of the bond sale mentioned above. Loans payable amounted to $3,019,000 at the end of the year as compared with $4,500,000 at the beginning of the year. The Delaware & Hudson had advanced for construction and acquisition of new lines $5,085,000 as compared with $4,275,000 at the beginning of the year. The greater part of the advances made during the year were for the Wilkes-Barre Connecting Railroad.

The following table shows principal figures in 1914 and 1913:

	1914	1913
Average mileage operated	904	904
Merchandise freight revenue	$8,153,086	$8,794,429
Coal freight revenue	10,844,093	11,436,960
Passenger revenue	2,946,665	3,277,929
Total operating revenue	22,595,029	24,153,495
Maint. of way and structures	1,670,364	1,787,614
Maintenance of equipment	3,649,673	3,753,963
Traffic expenses	314,327	305,966
Transportation expenses	8,602,636	8,584,722
General expenses	811,453	778,042
Total operating expenses	15,048,452	15,210,307
Taxes	671,119	623,107
Operating income	6,875,457	8,320,081
Gross income	7,979,068	9,683,485
Net income	3,169,527	4,926,977
Income from coal mining department	1,357,955	1,188,426
Net corporate income	4,607,863	6,174,736
Dividends	3,825,270	3,825,270
Surplus	782,493	2,349,466

NEW BOOKS

Statistics of Railways of the United States, 1903 to 1913. Bulletin No. 75, issued by the Bureau of Railway Economics, Washington, D. C. 81 pages, 6 in. by 9 in. Bound in paper.

Last year the Bureau of Railway Economics issued in Bulletin No. 66 a compilation of the statistics of the railways of the United States for the years 1900 to 1912, with the purpose of presenting in a form adapted for convenient reference the principal aspects of railway operation, as shown by official statistics. With Bulletin No. 75 the bureau has begun what is intended to be an annual series of similar statistics for the latest 10-year period for which the official figures are available. The railway tabulations are based upon official data published by the Interstate Commerce Commission for each fiscal year ended June 30, 1903, to 1913, and tabulations concerning population and area are based upon the reports of the census bureau. The bulletin contains 76 tables, classified under the following heads: Population and Area, Railway Mileage, Capital Securities and Dividends, Revenues, Expenses and Taxes, Employees and Compensation, Equipment, Freight Traffic Statistics, Passenger Traffic Statistics and Accidents, the various tables under each head giving the principal details for each year. Where such a division is suitable the figures are reduced to a mileage basis. The arrangement of the tabulations renders this bulletin of especial advantage from the standpoint of convenient reference, because it brings together in comparative form the figures for 11 years, thus doing away with the necessity for consulting the different volumes of the Interstate Commerce Commission statistics, and especially because all of the statistics are compiled for the three territorial districts now used by the commission. Prior to 1911 the Interstate Commerce Commission presented the statistics of railways by 10 territorial groups. Beginning with 1911, it has presented the statistics in three districts, eastern, western and southern, representing the three important traffic areas. The statistics given in this bulletin respectively for the three districts for the years prior to 1911 are combinations of the statistics originally published by groups. This makes it possible to obtain an accurate comparison of the statistics for the various years without the necessity of recasting the group figures. The bulletin is published in such a handy form that it should be indispensable to all who have frequent occasion to study the railway statistics and should be on the desk of every railway man, economist and foreign newspaper man who has current need for such compilations.

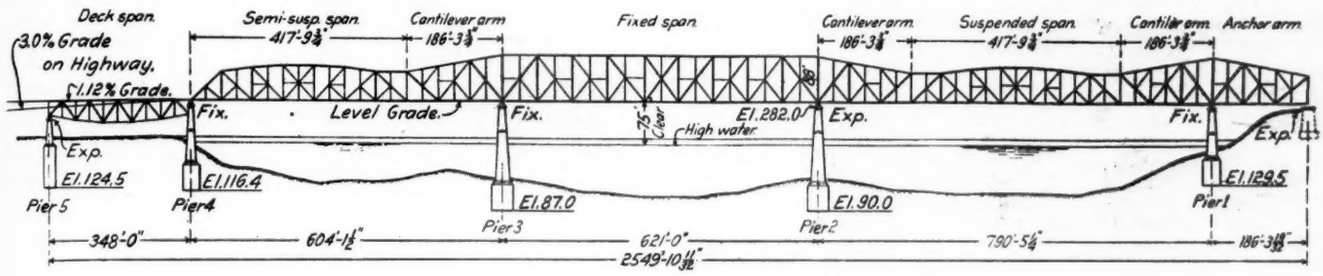
Substructure of the New "Harahan" Bridge at Memphis

Construction Methods Used to Build Piers for Mississippi River Bridge to Carry Three Roads and a Highway

By M. B. Case

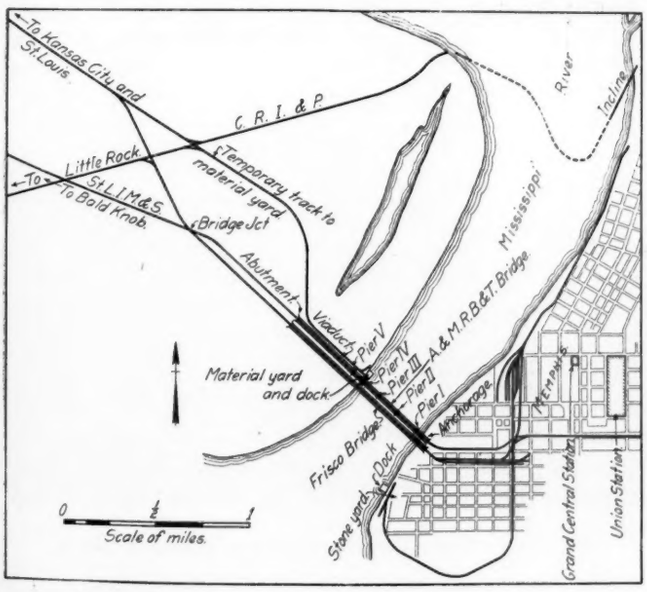
Resident Engineer, Arkansas & Memphis Railway Bridge & Terminal Co., Memphis, Tenn.

All traffic on the four roads extending west from Memphis, Tenn., must now pass over a single-track bridge completed in 1892 for the Kansas City & Memphis Railway & Bridge Company, which has since become a part of the Frisco system. In order to provide more adequate facilities, a new bridge is now being built by the Rock Island, the Iron Mountain and the Cotton Belt systems through a joint organization named the Arkansas & Memphis Railway Bridge & Terminal Company. Work was commenced in June, 1913, as mentioned in a preliminary description of the plans for this bridge in the *Railway Age Gazette* of October 31, 1913, and the substructure was entirely completed in January, 1915, slightly more than 18 months after the preliminary work was started at the site.



Elevation of New Mississippi River Bridge at Memphis

Active preparation for the erection of the superstructure of the main bridge is now under way. False work is being placed under one anchor arm, and derricks for unloading and storing the heavy truss members are being erected. The erection of the main bridge and the viaduct approach will be under way during the coming season.

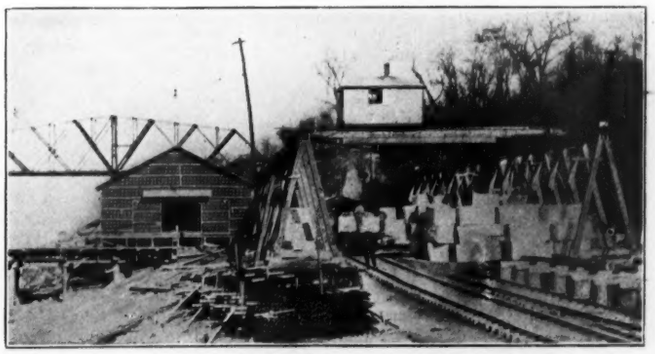


Sketch Map of Bridge Location Showing Material Yard, Stone Yard, Temporary Track, Etc.

THE NEW BRIDGE

The bridge will carry two railroad tracks spaced 14 ft. center to center located between trusses spaced 34 ft. 6 in., and two roadways 14 ft. wide on brackets outside of the trusses. The main bridge is 2,550 ft. long from the anchorage pier on the Tennessee bluff to Pier 5 located 345 ft. back from the low bank on the Arkansas side. Beyond this point a tower and girder viaduct continues over the bottom land for a distance of 2,363 ft. to the west abutment. The tracks are here carried onto an earth embankment 55 ft. high at the abutment, which extends westward on a tangent about ¾ miles to Bridge Junction, where the elevation is about 25 ft. above the general level of the bottom land.

The tracks ascend from the yards in Memphis on a 1.1 per cent grade to Pier 1, and run level to Pier 4, where they descend on a 1.126 per cent grade over the viaduct and the embankment, the necessary vertical curves being provided. The roadways start at Pier 4 to descend to the Arkansas bottoms on a 3 per cent grade along the viaduct until reaching an elevation above high water, about 23 ft. above the ground, when they run level for a short distance to the west abutment and then turn to the down stream side of the Frisco embankment on a single roadway structure to be provided by the county.



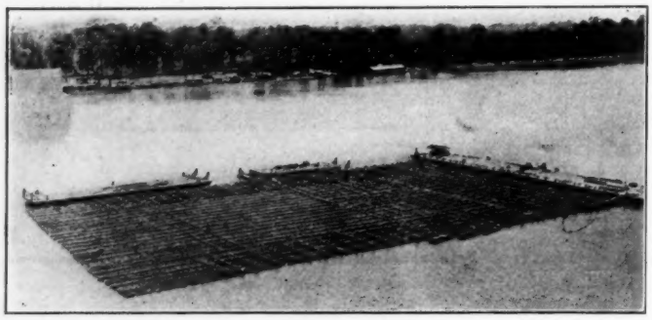
Stone Yard, Traveling Crane, Cement House and Dock on the Tennessee Shore

The center line of the new bridge is 200 ft. up stream, and parallel to the existing structure. Pier 1 on the Tennessee shore and Piers 2 and 3 in the river are directly above the corresponding piers of the old bridge, while Pier 4 on the Arkansas shore is 17 ft. toward the river from the center line of the old pier in order to permit the duplication between Piers 3 and 4 of the cantilever arm and suspended span used between Piers 1 and 2.

The piers are supported on pneumatic caisson foundations

resting on a very hard blue clay over-laid by several softer strata of clay having slightly variable characteristics. Above this is a bed of sand covered with the shifting alluvial silt of the Mississippi river. The caissons for Piers 2 and 3 are 42 ft. by 90 ft. by 51 ft.; for Pier 1, 40 ft. by 80 ft. by 59 ft.; for Pier 4, 31 ft. by 77 ft. by 62 ft., and for Pier 5, 25 ft. by 46 ft. by 81 ft. The height from the bottom of the foundation to the coping of Pier 2 is 192 ft., and of Pier 3, 195 ft.

The shafts of Piers 1, 2 and 3, resting on the caisson foundations, are 42 ft. long between the shoulders with pointed noses extending up to the starling coping a short distance above high water elevation. The up-stream nose or cut-water is fine-pointed from the mud line to the starling coping, and above this level the piers have semi-circular ends, both of which have a quarry face. The piers are built of 1:2½:5 concrete, faced with a light gray granite with the exception

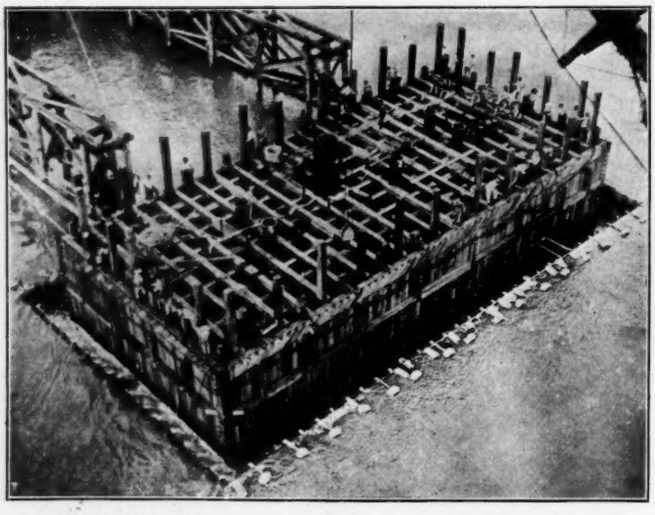


Laying a Willow Mat Over the Site of Pier II to Reduce the Tendency to Scour

of the three courses under the coping which have granite backing as well as facing. The stone was laid in Flemish bond with few exceptions, and the courses were 3 ft. thick up to the starling, with 30 stones in a course. Above this level the courses are reduced in thickness to a minimum of 2 ft. under the belting course.

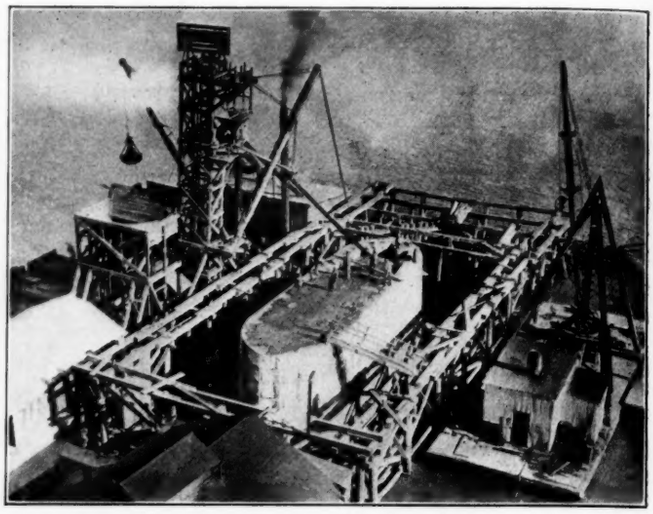
CONSTRUCTION PLANT

The most convenient ground available for the large storage and timber framing yard necessary was on the Arkansas



Launching the Timber Caisson at Pier III

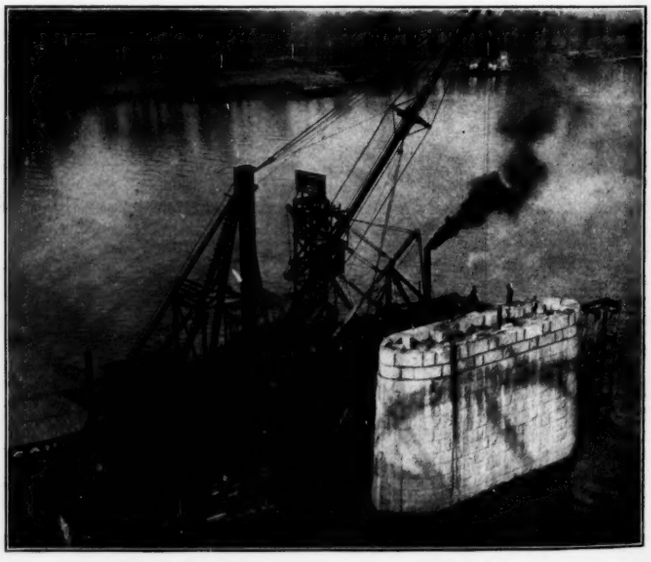
bottom land along the viaduct. This location furnished ample space at small expense, and permitted the quick and cheap delivery of material to barges for transportation to the piers. Although this ground was likely to be overflowed between February and June, a material yard on the high Memphis bluff would have caused considerable expense and delay in delivering material and supplies on the river, and did not furnish suitable ground for building the large number of barges required. The first preliminary construction consisted in building about two miles of track from the old Rock Island Hopefield line to the west bank of the river, as shown in the



The Concrete Mixing and Placing Outfit Working on Pier II

sketch map. This line connected with two tracks extending onto a dock equipped with a derrick for transferring material to boats.

The first three months were occupied almost entirely with the building of 15 barges, a part of which carried the various rigs needed in the construction and the rest were for use as cargo boats. In addition to these barges constructed on

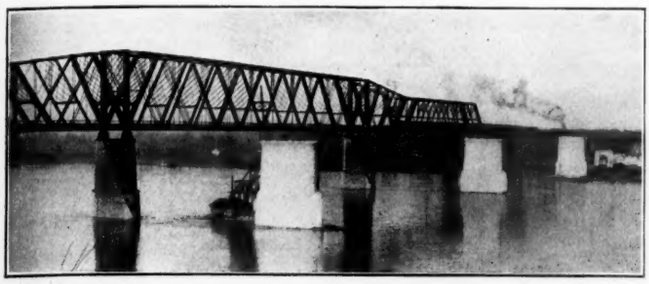


Placing the Upper Courses of Granite Facing on Pier II

the work six more were purchased second-hand, and several others and a small steam boat were chartered from time to time as required to keep the work going without delay. A screw propeller tug and two launches completed the marine equipment. The rigs built on these barges consisted of an air compressor plant, a concrete mixing and delivering plant, a pile driver, three derrick barges and two mat weaving outfits.

The granite for the piers was cut at the quarry and shipped from Stone Mountain, near Atlanta, Ga. This naturally called for storage on the east side of the river. A storage yard was obtained a short distance below the bridge on the

Tennessee side below the bluff but above high water. This yard was equipped with a traveling crane which unloaded the granite as received and later delivered it onto push cars which could be run out onto a dock with a derrick to lower it onto the barges by which it was delivered to the piers. A cement house of 3,000 bbl. capacity, for storage of a reserve supply, was also located on this ground next to the river. The greater part of the cement was delivered by

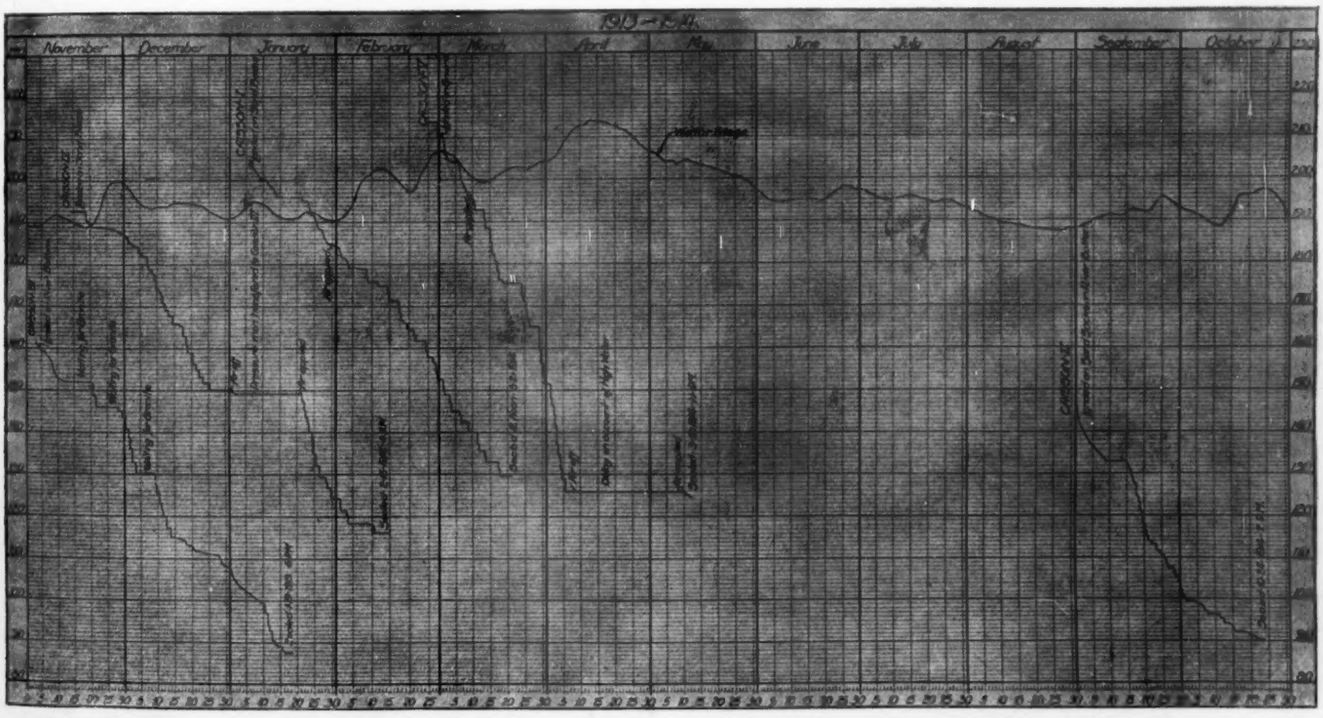


Piers II, III, IV and V Completed, Showing Also the Old Frisco Bridge

boat from St. Louis and unloaded into two covered barges of 1,500 bbl. capacity each. Cement intended for the storage house was shipped by rail, and used only when the deliveries by boat were delayed or suspended by the river conditions. This was but a small part of the 59,000 barrels used, and could be delivered directly into the barge houses by chuting down an incline.

The concrete mixing plant was carried on a barge 36 ft. x 100 ft. equipped with the familiar tower and chute for the delivery of concrete. Mississippi river washed sand and screened gravel were furnished by a local firm. This material was handled on the bridge company's barges of 275 cu. yd. capacity, and was raised into the hoppers over the mixer by a clamshell bucket and derrick located on the corner of the mixing plant barge opposite the mixer. These hoppers had a capacity of 50 cu. yd. of sand, and 70 cu. yd. of gravel. The material ran by gravity into a measuring hopper which discharged into a 1-cu. yd. mixer. Cement was elevated to the measuring hopper in a small car pulled up an inclined track by a line leading to a spool on the tower hoisting engine. The cement car ran back on a track extending under the roof of the cement barge which was moored below the mixing plant, thus reducing the handling of the cement and the loss and damage of sacks during wet weather. This barge carried a 60-hp. locomotive type boiler furnishing steam to the mixer engine and tower hoist. Ample steam was available for heating water and sand during chilly weather to hasten the setting action of the concrete, although low temperatures are not common at Memphis.

The compressor barge for the pneumatic caisson foundations carried four locomotive type boilers with a combined capacity of 300 hp., with the necessary pumps and feed water heaters. Three low pressure compressors with a capacity of 2,500 cu. ft. of free air per minute furnished air for the caissons, and one smaller machine furnished high pressure air for the boring tools and hammers used on the timber construction. A 25-kw. direct-connected generator furnished current for lights and for an elevator operated in the main shaft of the two deeper piers. The so-called hospital lock, for the use of the pressure men in relieving occasional cases of bends or after effects of the air pressure by recompression, was located on this barge. The compressors discharged directly into a small air receiver during cool weather, but during the warmer months the air passed through a series of cooling pipes before entering the caisson.



Progress Chart Showing Rates of Sinking Caissons at the Five Piers

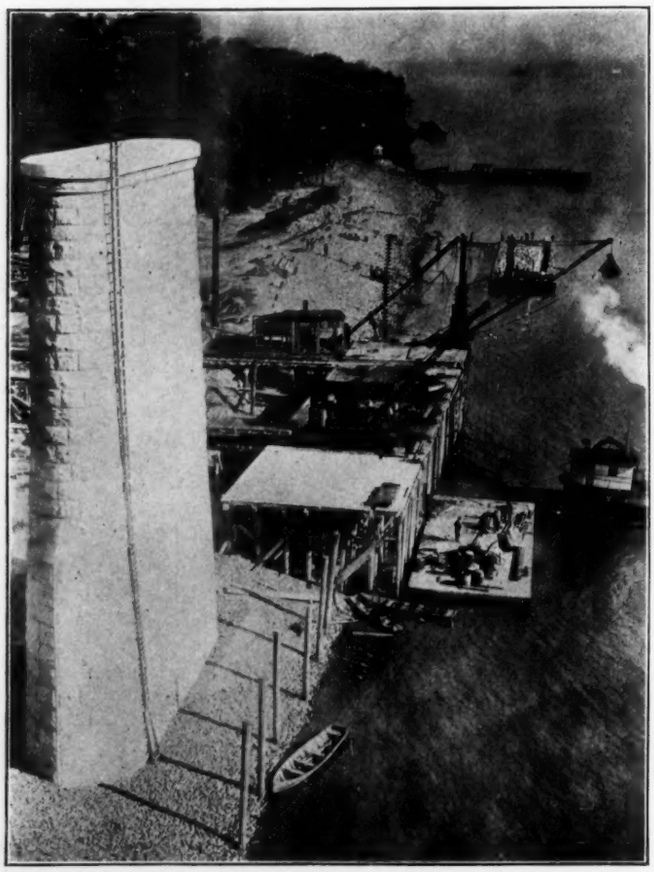
These were submerged in the river and supported alongside the barge. This plant was used for Piers 3, 1 and 2 in the order named. Another compressor plant built on the Arkansas shore west of Pier 5 was used for Piers 4 and 5.

SINKING CAISSON FOR PIER 3

Preliminary construction of barges and plant had advanced so that construction of the caisson for Pier 3 was started in September, 1913. This caisson was built up 14 ft. in a 54 ft. by 100 ft. by 11 ft. pontoon before launching. The weight of the caisson was distributed over the bottom of the pontoon by transverse loading beams consisting of two 12 in. by 12 in.

timbers well keyed and bolted together to act as a single beam 24 in. deep. These beams rested on longitudinal 12 in. by 12 in. timbers of the pontoon, and received the weight of the caisson at the cutting edge and center bulk-head. The pontoon was built with a longitudinal joint to provide a means of separating the two halves and withdrawing them from under the caisson after the pontoon had been flooded and the caisson floated. The bolts in this joint were removed just before flooding the pontoon. After the pontoon was submerged, the halves were pulled from under the caisson, the sliding surface being the top of the longitudinal timbers on the pontoon and the bottom of the transverse loading beams. The latter were afterwards pulled out by lines attached for that purpose before flooding the pontoon. The buoyancy of the timber in the pontoon was reduced very materially by loading it with pig iron immediately before flooding. The launching of this caisson was accomplished without trouble.

A well braced pile dock had been driven around three sides of the pier site previous to the launching of the caisson, which proved very satisfactory for holding it in position until well landed on the river bed and afforded a convenient and economical staging for the caulkers and the work of planking the sides of the crib during the sinking. It also furnished a location for a derrick on the upstream end of the pier, thus

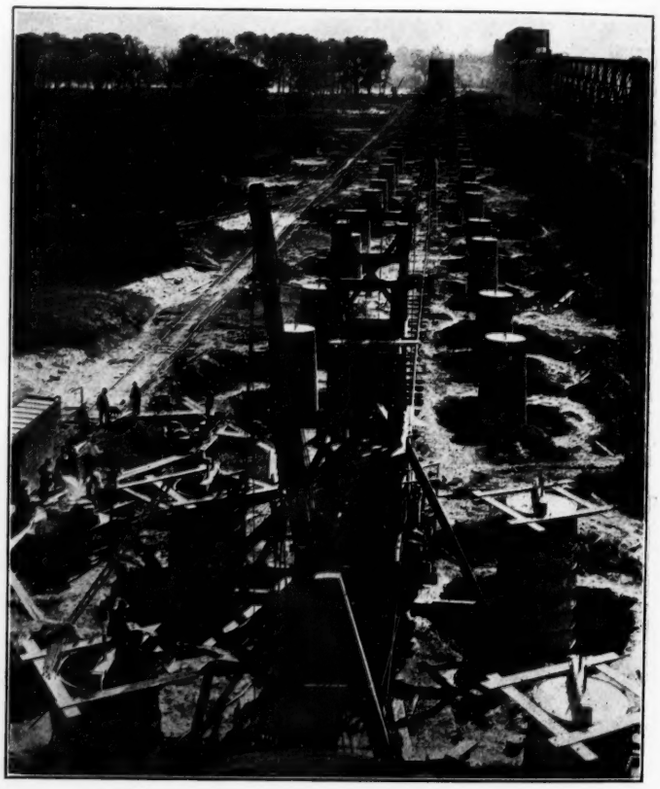


The Arkansas Shore Showing the Completed Pier IV, the Dock from Which Construction Material Was Handled to Barges and Shore Protection Extending Up Stream

getting a maximum amount of plant into position to work on the pier at one time.

A 6-ft. shaft, with a lock at the bottom a short distance above the roof of the caisson, was equipped with an electric elevator for handling the gangs in and out of the caisson, and in addition to this a 3-ft. shaft with a ladder and Morison lock was provided. Five 2-ft. material shafts were used for locking out the clay excavation and for passing in concrete when sealing the caisson. These material shafts were equipped with short vertical locks taking a bucket of 9 cu. ft. capacity handled by a derrick, the hoisting rope running through a packing gland in the top doors of the lock. These locks were very economical of air required for lockage.

While the sinking was in sand which was handled through 4-in. blow pipes, the rate of sinking nearly always depended upon the progress of building up on top, but when the clay excavation was reached sinking usually depended on the rate



Placing Concrete in Steel Pedestal Forms for Western Approach Viaduct

at which the locks could remove the spoil from the working chamber. After the harder clay was reached, the progress depended upon the rate of excavating the clay ready to be locked out. The accompanying diagram shows the rate at which the sinking proceeded on the various piers, as well as the immersion at various stages of the work. The highest air pressure required was 48 lb. on Pier 2, which continued for several days while the immersion was 107 ft. Pier 3 required 45 lb. just previous to sealing the working chamber.

In building up the piers, no difficulty was experienced in setting and backing one course each day. The water and sand were heated during chilly weather to hasten the setting action, so that the concrete was well hardened for the masons to work over on the following day.

OTHER PIERS AND THE APPROACH VIADUCT

The design of Pier 2 and the general construction methods followed differ but little from those described for Pier 3. Because of the much deeper water at Pier 2 (50 ft. as compared with 30 ft) it was necessary to use a removable cofferdam 15 ft. high as an extension to the crib. This was done to permit the landing of the caisson on the river bed, and to increase the buoyancy of the pier until sufficient friction and bearing was developed to carry the weight of the granite masonry. Because of the swifter current and consequent tendency to scour, the bed of the river was prepared to receive the caisson by sinking a willow brush mat 200 ft. by

300 ft. in size placed centrally over the site of the pier. The design and construction of this mat differed in no way from those placed by the Mississippi River Commission on other parts of the river. After the dock was driven through the mat 29,000 burlap sacks filed with sand were deposited at the pier site to reduce the depth of the water about 8 ft., and to give an even bearing on which to land the caisson.

Willow mats extending 150 ft. on both sides of the bridge axis were afterwards sunk and covered with rip rap for the entire distance between Piers 2 and 3 to protect the false work from scour during the erection of the 621 ft. fixed span, which also forms the anchorage for the 790 ft. cantilever span towards Pier 1, and for the cantilever arm and semi-suspended span towards Pier 4. After the completion of this channel mat work the same plant was used to place a mat along the Arkansas bank extending 1,000 ft. above the bridge.

The 76 pedestal foundations and the west abutment were built during the summer of 1914. The pedestals each contain 53 cu. yd. of concrete and rest on a 13 ft. by 13 ft. footing block supported by 16 30-ft. reinforced concrete piles of octagonal section, 16 in. between faces at the top, and tapering to 12 in. at the point. The reinforcement consists of 8 7/16-in. square twisted bars, spiral wound with No. 4 iron wire about 2½ pitch. The piles were cast on the Arkansas dock using 1:2:4 concrete from the river mixing plant, and were removed to the storage yard by a locomotive crane after 48 hours, where they were cured 30 days or more before driving. The concrete in the pedestals was made from crushed rock delivered on cars, and was mixed by a plant rigged on a flat car with tower and spout delivery. This car ran down the center line of the viaduct, and the four pedestals of a tower could be poured from one position of the plant. One of the accompanying illustrations shows the plant working on the last of the pedestals, and the steel forms used for the pedestal shafts.

Ralph Modjeski is the consulting engineer in charge of the design and construction of the bridge, and W. E. Angier is assistant chief engineer. The Union Bridge & Construction Company, Kansas City, Mo., were the contractors for the entire substructure, including the channel mats and bank protection work. They were represented in Memphis during the first season's work by H. K. Seltzer, vice-president and chief engineer, and later by J. F. Wilhelm, engineer of construction.

FRICTION SPRING DRAFT GEAR

On page 832 of the *Railway Age Gazette* for April 16, 1915, there was published an article with the heading given above, descriptive of the Slick friction draft gear. The first paragraph of this article read as follows: "The drawing below shows the plan and half-sectional elevation of the Slick friction spring draft rigging which was recently developed by the Carnegie Steel Company, Philadelphia, Pa." Through an unfortunate error the name of the manufacturing company was given incorrectly; the Slick friction draft rigging was developed by the Cambria Steel Company, Philadelphia, Pa.

A New Railway for India.—The government of India has granted a concession to the Khoolna Bagirhat Light Railway to build a 20-mile, 2½-ft. gage line from the east bank of the Rupsa river, opposite Khoolna, the terminus of the central section of the Eastern Bengal Railway to Bagirhat, the headquarters of the most important subdivision of the Khoolna district and a place of considerable importance. The present communication between the two places is unsatisfactory, steamer service having been discontinued because of the silting of the River Bhairab, which runs parallel to the proposed railway. The country through which the line will pass is populous. The line will be operated by the Eastern Bengal Railway.

NEW ENGLAND AND THE NEW HAVEN ROAD*

By Howard Elliott

Chairman of the Board of Directors and President of New York, New Haven & Hartford

In discussing the railroad and public utility question the opinion is sometimes expressed that the public cannot be expected to pay a return upon any more capital than was originally invested in a prudent manner. But is this the whole story, and who is to decide today what was prudent 10, 20, 50, even 100 years ago, as in the case of the Norwich & Worcester road? Must we not, as long as we stick to the theory of private ownership of public utilities, allow those private owners to make their investments with the hope of a profit inasmuch as they have to assume the burdens that come with increased values and take all the risks of loss?

Prudence, if carried to an extreme, may stop all progress. What would be the conditions in America, in the United States today, if Christopher Columbus, Amerigo Vespucci, Vasco Nunez de Balboa, John and Sebastian Cabot and daring spirits like them had been prudent? Emigrants to the west who followed were not always prudent, but they helped to make an empire. Where would our great American manufacturing and transportation enterprises be if men of enterprise, ingenuity and resource throughout the whole period of wonderful development of the last 50 years had not had the courage to enter unknown and untried fields of human endeavor and really been imprudent on many occasions?

It is so easy to look back, criticize and point out the mistakes of others, and so hard to look ahead, do constructive work, and take the chance of failure in the hope of producing results that are to benefit a whole community and a whole country.

Under private ownership we have built up in this country a very remarkable system of railroads, public utilities and large industries. They furnish more of comfort and convenience to the people of the United States than are obtained anywhere else on the globe. In doing this great work, the private owners have made mistakes, of course, and a few men have made great fortunes—comparatively few, if you take the trouble to count up, when the vast number of men engaged in the constructive work of the last 50 years is considered. Only 357,598 persons in our population of 95,000,000 had an income of $4,000 or more, according to the report of the commissioner of internal revenue for 1913, and the greater proportion of these were in the $4,000 class. Because of these mistakes; because of a few great fortunes; because the growth of these great businesses has been very rapid and some of the men guiding them have not always grown as rapidly and considered carefully enough the rights of the public, there has been developed a system of regulation by state and national commissions. This is right and proper because human nature is such that people with power, unless checked, sometimes exercise that power unwisely. The regulators, however, given great power by the people, are human, too, and the business of regulating the public service corporations and the business enterprises is new, and men are trying to find out the best way to do it.

In the evolution of the regulatory system, mistakes are being made, and the absence of a check upon the vast powers of the various commissions has led to some arbitrary exercise of those powers and some harm has been done by this regulatory system. I am glad to say that some of the state and national commissioners, particularly in New England, realize the seriousness of the situation and the great responsibility that accompanies the unusual powers that have been delegated to them and that they are acting accordingly and are now trying to protect the public service corporations and business of the country.

VALUATION

A very important problem before the country today is that

*From an address to the members of the Eastern Connecticut Development Committee and of the Civic Associations of Norwich, New London, Willimantic, Putnam and Danielson, at Norwich, Conn., on April 8, 1915.

which involves the fair valuation of railroads and public service corporations.

This matter is very vital to the New Haven road and to the welfare of New England because of the present disturbed and depressed condition of the transportation business. The Interstate Commerce Commission under the direction of Mr. Prouty and with the hearty co-operation of the company has just begun the valuation of the New Haven.

In 1910 a valuation of the New Haven property was made under the direction and by authority of Massachusetts. The engineer in charge reported to the state authorities that there was a value at that time in the properties of $101,000,000 above the par value of securities outstanding. In arriving at his result the engineer did not include anything for intangible assets such as those taken into account by the supreme court of Washington.

WORLD CHANGES AND TERMINALS

The country has grown since 1910, and certain world changes are coming, which will increase rather than decrease the value of the New Haven property.

One result of the European war will be to make the United States the leading commercial and financial power of the world. Furthermore, it will increase the commercial importance of industrial centers in New England and New York. The value of the New Haven road today, with its important terminals in all these cities, is certainly no less than it was in 1910. Terminals in great cities are hard to obtain and it is slow work developing them. The great South Terminal station at Boston and the approaches over and through which 35,000,000 people go to and from their homes each year, and the great freight yards and docks in Boston, because of their location and use by the public, have a value far above the original cost which in some cases was incurred many years ago. The same may be said of important terminal properties in Providence, Hartford, New London, New Haven and many other places. Terminals are hands and feet to the railroad; without them the road is as helpless as is the man.

The much discussed New York, Westchester & Boston road has been most costly, but looking ahead a few years this entrance to the city of New York through this road will be of great value in facilitating business between New England points and that city by taking some of the local short-haul business off the main line which at times is overtaxed.

When the valuation of the company's property is made, I firmly believe that on any fair basis there will be more than enough value found in these great terminals, above what they now stand on the books of the company, to offset the losses that will probably be sustained in selling the properties under the decree of the federal court. It is especially important to the general financial health of New England that all reasonable elements of value shall be taken into account in arriving at the value of the New Haven road because its securities are such an important part of the financial fabric of New England.

Recently the commissions, state and national, have permitted the New Haven to make several increases in passenger rates. People naturally do not like to pay more, but it seems better for New England to place more of the burden of supporting her railroads on the passenger travel and in that way make it less necessary to advance the freight rates on raw materials, manufactured articles and food products.

An examination of the passenger train earnings of the company for two periods of two weeks each shows how many passenger trains are being run that contribute nothing directly to the financial upkeep of the road.

Trains earning per mile:	July 18-31, 1914		January 18-31, 1915	
50 cents a mile or less...	619	25.2 per cent	670	31.9 per cent
50 cents to $1.....	660	26.9 per cent	618	29.5 per cent
$1 to $2	621	25.2 per cent	494	23.5 per cent
Over $2	557	22.7 per cent	316	15.1 per cent
	2,457	100 per cent	2,098	100 per cent

In the two weeks in January there were 257 trains running daily, except Sunday, that earned 25 cents a mile or less.

In the eight months ending February 28, 1915, the average cost of running all classes of trains, freight and passenger, was, without taxes, $2.04 and for so-called "transportation expenses" (nothing allowed for maintenance of way and equipment and administration) the average cost was $1.13. Thus, you see that out of the 2,000 to 2,500 trains run every day, more than half fail to make the average cost of running without taking any account of maintenance or overhead charges; and this, too, in spite of the fact that during the past year the company has discontinued many of the poorer paying trains. This non-remunerative service is a direct contribution to the general development of New England business as a whole.

GENERAL OBSERVATIONS

This New England railroad situation, with conflicting laws in different states, calls attention very forcibly to the desirability of a federal incorporation act for those railroads the majority of whose business is interstate. Exclusive federal jurisdiction over corporate affairs and of finance would not interfere with the rights of the states in matters of local regulation. A simplification of the relations between the railroad and one central governmental agency as to corporate and financial questions would save a great deal of time and energy now used by officers in appearing before many different state organizations, and give them that much more to devote to details of management and to constructive work for efficiency, economy and improved service to the public.

The present condition of the American railroads is due in part to an effort on the part of the country to fix rates and service by regulation, and at the same time have them fixed by competition, thus creating an almost impossible condition, somewhat destructive of results and values. It is a question how far it is to the public interest to apply the so-called anti-trust law to the transportation business. Well organized, prudently managed and wisely regulated combinations of railroads may, in the long run, produce greater efficiency and service to the public than excessive competition, with the resulting duplication of facilities and increased expenses.

A SECRETARY OF TRANSPORTATION

To day the government recognizes some of the great commercial activities of its population by departments and cabinet officers, such as the secretary of the treasury, secretary of agriculture, secretary of commerce, and secretary of labor. The transportation business of the United States is next to agriculture in importance, in volume, and in its relation to the welfare of the whole country, and it should have a defender in the councils of the cabinet.

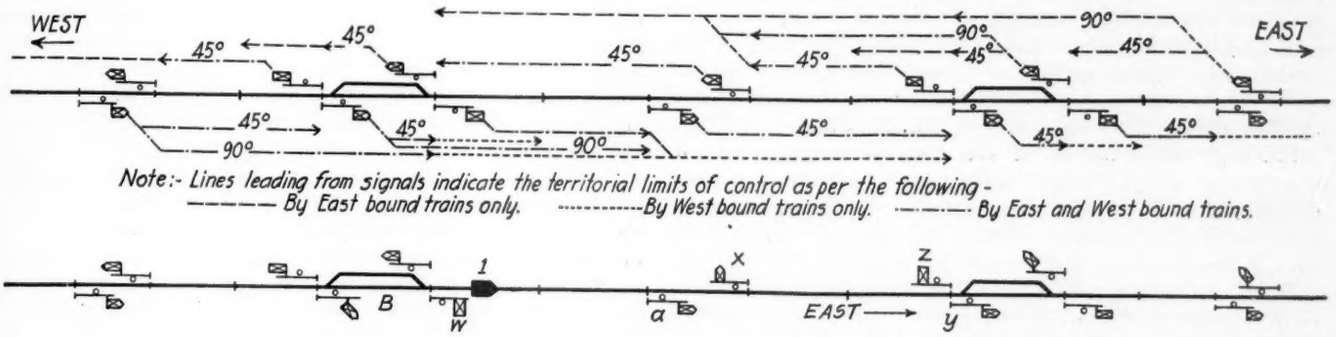
I believe it would be well to have a department of transportation, with a secretary of transportation at the head of it, who would be a member of the cabinet. Such a man would of necessity have to champion somewhat the rights and privileges of the transportation business just as the secretaries of the treasury, commerce, and labor speak for their particular subjects. Such an officer would have a wholesome balancing effect between the demands of the public and of the regulatory organizations on one side, and any errors of policy and management on the part of the owners of the property on the other side. These are great questions which require the careful thought of just such organizations as your development committee. They may not seem to affect you very much, but until they are settled and settled right they do affect everyone in the United States.

With a settlement of this great transportation question on a "live and let live" basis, there will be more time for the great machinery of the railroad organizations to do constructive work in helping to build up the territories served by their roads not only to the advantage of the manufacturer, but what is even more important, to the farmer, a subject to which your committee is paying very proper and effective attention.

THE ENGLISH NATIONAL UNION OF RAILWAYMEN.—Advanced figures published by the National Union of Railwaymen show that at the end of last year it had 273,362 members.

AUTOMATIC BLOCK SIGNALS ON THE WESTERN MARYLAND

In connection with a general program of extension and improvement, the Western Maryland recently completed the equipment with automatic block signals of the 61-mile single-track section of its road between Big Pool, Md., and Cumberland. This is an important single track line between a number of lines on the east which converge at Hagerstown, Charlton and Cherry Run, and two heavy-traffic lines on the west which join near Cumberland. A portion of the line signaled passes through a very rough district, necessitating many deep cuts and tunnels, as well as nine crossings of the Potomac river. The railway follows the banks of this river, crossing and recrossing to obtain the most advantageous locations. The signals through the tunnels were put in service first, before construction was started on the other parts of the line, usually four signals at each tunnel.



Arrangement of Automatic Block Signals on the Western Maryland; Single Track

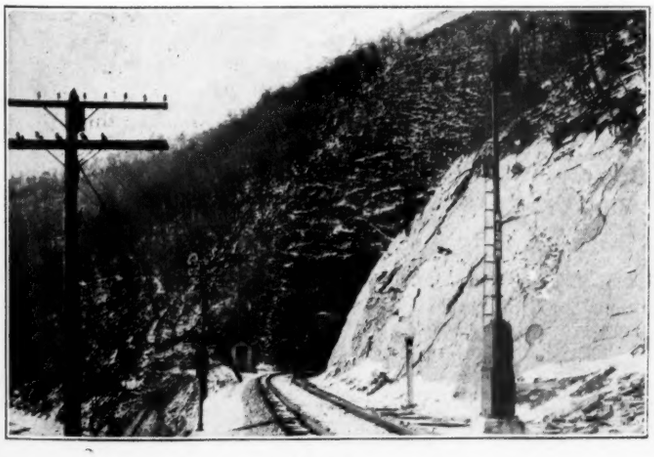
The 61 miles of track between Cumberland and Big Pool includes 38 miles of tangent and 23 miles of curve, with 3,182 deg. of curvature. The maximum curve is 6 deg., and the maximum grade is 0.3 per cent. Considering the ruggedness of the country, these standards are quite low, and the gradient is so low that it was not necessary to consider it in the location of the signals. Serious difficulties were encountered, however, because of curves, rock cuts, tunnels and bridges. There are five tunnels with a total length of 10,144 ft. There are 23 bridges, 9 crossing the Potomac river with a total length of 6,464 ft., 4 over the Chesapeake & Ohio canal with a total length of 387 ft., and 2 separate crossings of the Baltimore & Ohio with a total length of 370 ft. All other bridges total 875 ft., giving a grand total of 8,005 ft. of bridges.

A short time ago the company put in effect on this section of the road the telegraph block system; but recently most of the telegraph was superseded by telephone, at which time it was possible to effect a reduction in the number of employees concerned in despatching trains, some offices being discontinued. There was no further reduction in this force when the automatic signals were installed.

The signal system used is the Union Switch & Signal Company's "A. P. B." system, providing against opposing movements to the siding in advance and rear protection the same as on double track. The rules of this road, however, allow no movements past either an absolute or a permissive automatic signal on single track without sending a flag ahead. When a train encounters a signal at stop it must be flagged through to the next signal or to the next telephone where communication may be had with the despatcher. Control from the train order signals at the stations is carried back through one automatic, or if it is very close, through a second automatic signal, so that the engineman is given ample notice to stop for orders. The general arrangement by which signals are successively changed as a train passes over the road is shown in the accompanying drawing.

Because of the curvature, cuts and tunnels it was found difficult to get good locations for intermediate signals and provide a good view for the engineman, and therefore, except in two cases, there is but one intermediate signal in each direction. The intermediate signals are staggered, and the maximum protection was obtained by arranging the circuits so that the intermediate signal for the movement in the opposite direction stays at stop until the rear of the train proceeds far enough to secure the indication of the starting signal for the opposite direction at the next siding. This is explained in the lower part of the drawing. Thus if a following train has left the siding in the rear (B), the leading train will not secure a proceed signal to back up. Should two trains, one eastbound and the other westbound, pass starting signals at the same time and proceed toward the center of the block between sidings, they would be stopped by the intermediate signals before meeting.

For example, in the drawing, train No. 1 when it passes *x* would, under certain arrangements, allow that signal to go to



Intermediate Signal at Entrance to Tunnel

A Five-hundred-foot Wire Span

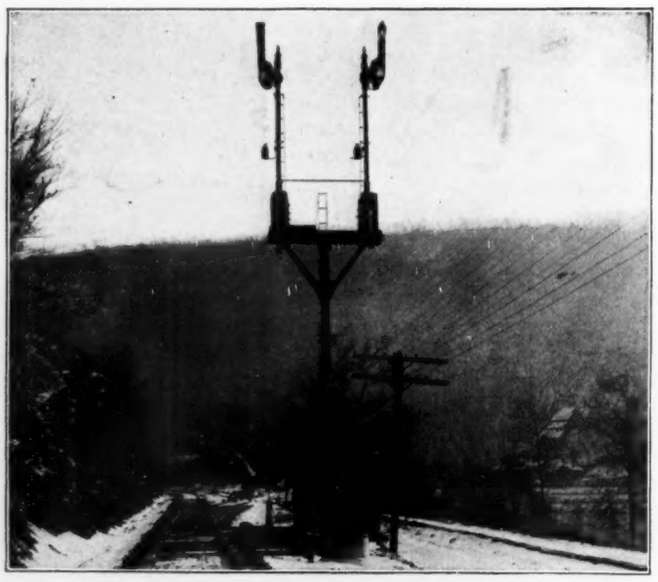
the clear position; but in this scheme of signaling it remains in the stop position until the rear of the train has passed signal *y*. If, then, a following train had passed *B*, it would hold signal *z* at stop and warn the leading train not to back up.

In this arrangement it is necessary to hold signal *x* at stop, as noted, because signal *w* assumes the diagonal position when the rear of train No. 1 passes signal *a;* and if signal *x* assumed a proceed position when the rear of the train passed, it would be possible for the train to back up, under a clear signal at *x*, at the same time that a following train proceeded past caution signal *w*. In other words, as the block from signal *w* to signal *x* has no preliminary, one of these two signals must be held in the stop position against opposing movements.

On account of the possibility of slides in the rock cuts where the rock is constantly spalling off, emergency knife switches were provided, located in boxes attached to the sides of the signal cases. These boxes are locked with standard switch locks. If the track is found obstructed the knife switch may be opened, which will set the signals in both directions at stop.

The night color indications are white for clear, green for caution and red for stop. Signals are double-case ground-mechanism, three-position, upper-quadrant, low-voltage style S, operated by direct current. Switch indicators are used only at ends of passing tracks which are long enough to accommodate a train of some size and where there is no double signal location. Switch indicators are of the semaphore type, unilluminated at night.

BSCO battery is used for both line and track circuits, 16 cells being provided for the signals, and 3 cells in multiple, with resistance in the positive lead, for track circuits. At double signal locations, both banks of battery are placed in one Massey style C well, while at single locations they are placed in a style K well.



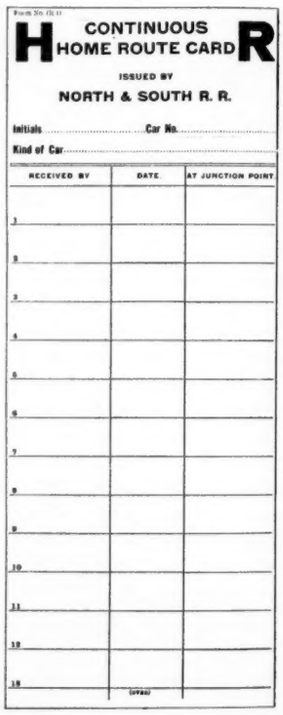
High Post to Make Signal Visible Beyond Hill

Before putting the installation into operation, the signal department prepared a chart showing a typical arrangement of signals and the operation while a train was passing through a section. A track layout was also prepared giving the location of all side tracks, signal numbers and approximate distances between signals. These were used in instructing the trainmen and were made as simple as possible.

Each signal maintainer has a helper. He has a gasolene motor car, and in addition to looking after the signals he takes care of all lamps, batteries, highway crossing bells and outlying telephones. Signal maintainers are required by the operating department to pass an examination on train rules and train orders, and the movements of the motor cars are made on orders from the despatcher. The work was installed under contract by the Union Switch & Signal Company. E. E. Bradley, signal engineer of the Western Maryland, had supervision over the design and construction and is in charge of maintenance.

CONTINUOUS HOME ROUTE CARD RECOMMENDED

The committee on relations between railroads, of the American Railway Association, has accepted the recommendation of the Association of Transportation and Car Accounting Officers to submit for general use a continuous home route card, for use with freight cars when away from the home road; and Secretary W. F. Allen, acting in behalf of the committee, has issued a circular giving the rule proposed for the guidance of station agents and yardmasters, in the use of the cards, and showing also a fac-simile of the proposed card. This card is 3¾ in. wide and 9½ in. long; a reduced reproduction of the face of the card is shown herewith. There are spaces for thirteen notations of transferences of the car from one road to another; the back of the card has 17 more spaces, making 30 in all. When the car has been transferred from one road to another 30 times (if it has not then reached home) the rules provide for the use of a second card, to be attached to the first, and containing spaces numbered from 31 to 62 inclusive.


CONTINUOUS HOME ROUTE CARD

ISSUED BY

NORTH & SOUTH R. R.

Initials ..... Car No. .....

Kind of Car .....

RECEIVED BY	DATE	AT JUNCTION POINT
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		

The committee has not yet presented its formal recommendation to the association, but in view of the desirability of a gradual introduction of the plan, it is recommended that all members begin using the new card on May 1, 1915.

The first and perhaps the most important feature of the regulations is a requirement that the road owning the car shall prepare the card, and deliver it with any car delivered to a connection. In case this card is lost the road losing it should at once make a new card to go with the car for the rest of its journey.

Until action by the association the use of this substitute card will be optional. The committee intends, however, to recommend a rule for the use of such cards. As a substitute card shows an incomplete record of the car since it left its home, it may not afford full information for the car's return; but in that case the receiving road can return the car to the delivering road or to the road making the substitute card.

The committee calls attention to the desirability of having uniform stamps for making notations on the cards; and Secretary Allen (75 Church street, New York City) will take orders for rubber stamps, ink pads, etc.

A number of important railroad systems have used continuous home route cards for some time, within their own territories, and have found the plan very satisfactory. Knowing the route by which a car has come, an agent can often save miles of car-haul, and perhaps days of per diem charges, by sending a car back to the delivering road by a shorter route. The proposed rule will require that the short route be used whenever it can be done without creating empty mileage in excess of the original loaded haul.

The Real Value of a Freight Locomotive*

As Determined By the Transportation Department, Each Movement Must Be Carefully Studied and Analyzed

By N. D. Ballantine
Assistant to Second Vice President, Rock Island Lines

In studying the value of a locomotive, time is an essential factor, and any study which does not take into consideration all the factors affecting the machine, that is the entire time from its purchase to the scrap pile, fails to fully accomplish the task. It may be profitable to scrap and replace, or modernize; the new locomotive may not be profitable if it be a radical departure from established custom or not properly designed for the purpose for which it is to be used.

This is said with a full realization that there are many small roads or light divisions of trunk lines where the freight service is practically fixed by arbitrary local or through freight runs, concerning which the superintendent can readily keep all such information in his head or a vest pocket memorandum book, and no amount of records or statistics made therefrom will bring about a reduction in expense incident to train service, engine mileage or miles per day per engine. Where such a condition exists the amount of labor to keep the data is insignificant, but it is of value to have all data on a large system kept uniformly that the aggregate may be obtained, as during a serious congestion or an unusual condition, it may be of value to the distributing officer, who cannot work intelligently by a rule of thumb.

With respect to the cost of producing such data my opinion, based on experience, indicates that where all other data of a similar nature is discarded and all work on the one system on a number of light divisions, no increased labor expense can properly be charged on divisions having 75 to 100 freight locomotives assigned. A $60 to $75 a month clerk can summarize the data in from six to eight hours work per day. The work of summarizing and working out averages for 21 divisions in the general office can be done in from 30 minutes to one hour's time per day.

Considering a modern freight locomotive worth from $25,000 to $30,000 with a potential gross freight revenue, when actually moving freight, of from $75 to $100 an hour, does it not seem to warrant a complete analysis of its use while in the hands of the various departments? Consider also the ever present tendency to shift blame from one department to another. If a potent factor in producing friction between departments is due to an absence of definite information as to all the facts, is it not worth while to produce the data so that each department has first hand opportunity for introspection so far as concerns the locomotive detention while in its possession, and realizes that the same data is correlated into the whole, from which the general officer can intelligently "judge the quick or the dead."

There is a growing tendency towards the introduction of abnormally large power units. Any radical departure from well established practices or customs in railroad service naturally carries with it changes which in their ramifications beneficially or adversely affect many departments. As an illustration, consider as a maximum, a given sized locomotive, with main and passing tracks, bridges, yards, clearances, turn-tables, coal chutes, water cranes, roundhouses, shops and roundhouse machinery to properly handle them. If one or more locomotives are purchased of from 30 per cent to 60 per cent greater tractive power, with dimensions necessitating a change in any or all of the above mentioned factors, then the additional expense incident to such changes should be considered whether charged to additions and betterments or operation.

The principal object in the purchase of new locomotives is doubtless to take care of the "peak load," to decrease the cost of operation and facilitate the movement of traffic. After they are purchased the operating man need not bother himself about the interest, taxes, insurance and depreciation. They are "with us always," but his problem is to so utilize the power as to reduce the cost to a minimum during periods of light traffic, and during the "peak of the load" to move the traffic as cheaply as possible, but move it. Congestion of traffic is as dangerous to a railroad, as is pneumonia to an individual, and it is to avoid this condition and clearly point out the economics for each division during times of heavy demand that it is so essential to have reliable and current data produced during the entire period. Assuming that the peak of the load extends over a period of three to four months, it is evident the excess number of locomotives, or their equivalent, to take care of this load, have no earning power during eight or nine months of the year, but are a liability and expense; during the three or four months of heavy demand, their earning power is quite a variable factor. In fact during this period only is the opportunity present to obtain the maximum return from the investment, hence the importance of a time study with a view of having as few engines as possible tied up to protect a heavy movement.

While records or statistics therefrom do not necessarily of themselves bring about economies, it is submitted that with a problem containing so many unknown factors, many of which are very important and substantially affect the net results, if they can be set out and their proper relations ascertained, at least some operating men should be able to interpret them and knowingly effect economies in transportation. They are not a cure-all but an index or pointer to those who can read and interpret.

As an illustration of some of the methods by which such data can be used, let us take some data which for the sake of argument we will say are typical for a given division of 480 miles with 60 per cent of its mileage branch lines, all of it single track, with a train density of 14 per day, seven freight and seven passenger, and with 52 freight engines assigned and an average of 41 engines available.

Mechanical department, total		14 hr. 03 min.
Roundhouse		7 hr. 46 min.
Classified repairs		2 hr. 50 min.
Running repairs		3 hr. 27 min.
Terminal detention		3 hr. 27 min.
Regular schedule		2 hr. 06 min.
Stock, fruit, etc		07 min.
Superior trains		06 min.
Insufficient tonnage		34 min.
Rest for crews		05 min.
Miscellaneous		11 min.
Between call time and departing		18 min.
Waiting for engine	03 min.	
Making up trains	10 min.	
Meeting trains	02 min.	
Miscellaneous	03 min.	
Between terminals		6 hr. 30 min.
Actual running time		3 hr. 38 min.
Meeting trains		55 min.
Station work		1 hr. 28 min.
16-hour law		02 min.
Accidents, washouts, etc		01 min.
Block signals		02 min.
Engine failures		03 min.
Car failures		03 min.
Miscellaneous		18 min.
Weather conditions		.....

The average tractive power of the engines was 37,700 lb., the gross tons per train mile averaged 858 tons, the average miles per engine per day on assigned basis 63.8 and on available basis, viz., excluding those in shops 79.3. The average speed between terminals was 9.8 miles an hour and when actually running 17.5 miles an hour. The delays between terminals per 100 freight

*Abstract of a paper presented at the Western Railway Club meeting, April 20, 1915.

train miles was 4 hr. 29 min., of which 1 hr. 27 min. was meeting trains, 2 hr. 18 min. station work and 44 min. miscellaneous items. Overtime was $90 per day, $20 of which was terminal overtime, and $70 road overtime. The gross freight earnings of each engine was 76 cents a minute while running and $176 per day.

From the division of time shown above, it will be noted that the mechanical department had the power 58.5 per cent of the total time, and that the balance of the time, that is 9 hr. 57 min., it was in the hands of the transportation department, 65 per cent of it is between terminals and 36.6 per cent actually running. This, of course, considers all trains, locals, mixed and through, the schedules of which are fixed; when traffic is heavy it is easier to increase the miles per day by reducing the terminal delays. It is fair to assume under normal conditions that if the transportation department can utilize one-third of the time the power is in its hands, in moving traffic under stress of heavy traffic, this proportion can be increased. We know from experience that it so works out in practice and that it can utilize the power for at least 50 per cent of the time it is in its possession. The question then comes, "What can be done to increase the actual running time or revenue producing period?" What increased return can be expected?

Assuming the average earnings per gross ton mile to be 2.94 mills, and the average engine to haul 858 gross tons per train at 18 miles an hour when actually running, the earnings would be $44 gross. One half an hour increased use per day would mean an increase of $22 per day for each hour's decrease in delay on the part of either the mechanical or transportation department. Put in another way, let us assume the average detention to all engines was reduced one hour. This would give the transportation department 52 engine hours, from which we should expect it to utilize 26 hours actually running and moving freight. As the average running time per locomotive per day was 3 hr. 38 min., this would be equivalent to an increase of about seven engines, increasing engine mileage 455 miles hauling 858 gross tons per train mile, and earning an equivalent of 2.94 mills per gross ton mile, or $1,148 per day. At the same time this additional train mileage would produce 12,285 more car miles per day based on handling 27 cars per train. Assuming that the average miles per car per day was 24.6 miles prior to the time this improvement occurred, this is equivalent to increasing the car supply approximately 500 cars, and the miles per day 12.5 per cent—a cash equivalent from a per diem standpoint of $225 figured at the current per diem rate of 45 cents per day, which item might properly be credited against any increased cost necessary to bring about the reduction in freight car delay and increase its utilization.

There is an important relation between transportation expense and the cost of freight equipment, namely that for every dollar spent for freight transportation, from 30 to 40 cents in addition is spent for the freight car in which it is moved; the items included in this comparison are shown below:

Transportation Expense (For each $1.00)	Cost of Freight Cars 30 to 40 cents
Under I. C. C. Classification	Which, in the case of foreign or private line cars is not a charge to operating expenses, but to the hire of equipment account; in case of owned equipment operating expenses are only affected to the extent of the net cost of repairs, renewals and depreciation, including insurance. A very considerable sum represented by the funded debt or mortgage and the taxes are not charged to operating expenses.
Supervising transportation	
Station service	
Yard service	
Road engine service	
Train service	
Other transportation expenses	
Accounts 371 to 420 inclusive	

The basis generally adopted for the comparison of the maintenance of freight cars is the freight car mile. Under M. C. B. rules the owner of a car is charged with practically all expense of its maintenance except that which may result from accident or unfair usage, and this expense for the railroads varies roughly from three-quarters of a cent to one and one-quarter cents, or, say, a general average of one cent per car mile. If road A is a heavy borrower of freight cars, its maintenance of equipment expense will be materially reduced as the owner of the car will be paying directly, or indirectly, for repairs to cars, the expense for which is charged to his maintenance of equipment account, while the money received from A as a rental is credited to the loaning roads' hire of equipment account. Road A at the same time charges the amount to hire of equipment, which however, is not an operating expense. The net result then of loaning equipment is to increase the hire of equipment account at the expense of maintenance of equipment, the former being an "income account" and the latter an "operating expense." If the car mile is a controlling factor in the cost of repairs, it will readily be seen that if the borrower so handles the car as to make an average of 45 miles per car per day with it, the owner will have to spend all the car per diem received from the borrower to keep up the repairs while he is using it, receiving nothing for interest or taxes. While this may be a slightly different angle from which the subject is viewed by many operating men, the reason for it is undoubtedly due to the fact that our accounting methods do not properly reflect in operating expenses the influence which the ownership of freight cars has on the net return from the investment therein. Its proper relation to the operating man and his operating expenses would seem to be worthy of considerable emphasis, when the amount involved represents the equivalent of 30 to 40 per cent of the total amount spent for conducting transportation expenses.

Reverting now to the net return from a decrease in delay to freight power, keeping in mind the typical division, let us set down the tangible debits and credits as far as we can.

		Dr.	Cr.
455	Engine miles, repairs at 15.2 cents per mile	.....	$69.16
390,390	Gross ton miles at 2.94 mills revenue	$1,148.00	.....
12,285	Freight car miles, repairs at .7 cent	.....	90.19
500	Freight car days at 45 cents per day	225.00	.....
	Yard service at 21.9 cents per mile	.....	99.64
	Road engine service at 40 cents per mile	.....	182.00
	Train service at 16.2 cents per mile	.....	73.71
	Other transportation expenses at 16.4 cents per mile	.....	74.62
		$1,373.00	$589.32

Considering the above items alone and without going into the detail accounts, the locomotive would appear to produce a return of 233 per cent of the expenses incurred. Included in the above items, however, are a number of factors which will not increase the cost as much as indicated, for the reason that many of them do not vary in a direct relation with the train miles. For example, under yard service accounts, at least 30 per cent of the items going to make it up, such as yard masters and clerks, switch and signal tenders, yard supplies, operation of fuel station, water, lubrication and operation of joint yards would not vary directly as the train miles. If the yards were not working to their capacity, there might be an increase only in fuel, water and oil, and that only perceptible. Under road engine service the engine house handling, operation of fuel stations, water and other supplies, items approximating 12 per cent of the amount, would not be directly affected. Under train service expense the items other than train supplies, cleaning, heating, icing, watering, coopering and grain dooring freight cars, as well as detouring freight trains, represent 16 per cent of such expense and do not necessarily vary directly as the train miles. Under other transportation expenses, such items as block signals, interlockers, crossing flagmen, drawbridge operation, telegraph and telephone operation, stationery and printing, and operation of joint tracks, amounting to approximately 20 per cent of the items, would not be affected appreciably.

30 per cent of yard service expense	$33.20
12 per cent of road engine service expense	21.70
16 per cent of train service expense	11.75
20 per cent of other transportation expense	14.90
	$81.55

Deducting 81.55 from the $589.32 leaves $507.77, or considered from this standpoint the return would be 240 per cent instead of 233 per cent on the first premise.

In the above calculation no consideration is given the question of track maintenance, as it is rather an intangible, although

an important factor. However, additional expenses on this account should of course be deducted from the $507. It should be clearly understood that this method of figuring costs, is not a proper one for the purposes of rate making, as it eliminates a large number of items of fixed or current expenses which would not vary regardless of the manner in which the traffic is handled, but which items should be included in any method of computing entire costs of service. The above outline in a general way indicates what economies or increase in utilization might be expected from improving given conditions.

Let us now consider the comparison of results from a change in method of handling through freight power, viz., from slow to higher speed, with consequent decrease in gross tons per train. For the purpose of this comparison we will assume the data is obtained from an analysis of the locomotive utilization, together with the gross tonnage and unit cost figures carefully produced and not based upon general averages of such units. It might be opportune at this time to point out the great difficulty in attempting to forecast results of a change in working conditions. For example a trainmaster once said to me, "The meeting points on a single track railroad vary as the square of the number of trains run; that is, if you double the number of trains you quadruple the number of meeting points." A little thought indicates the statement by itself is incomplete and misleading, as two very important factors are omitted, namely, the time of day at which the trains are to be run, and the average speed at which they are to run between terminals. It can readily be shown from a theoretical point, as well as in practice, that it is possible to double the number of trains run and decrease the number of meeting points or delays incident thereto. Hence just what effect a change in the number of trains will have on the question of delays due to meeting trains is an indeterminate factor. But if the data is known for a particular division with given facilities and a given train density, the actual effect may be readily found, and at the same time, any other unusual factors which may be injected into a given day or interval of time, can be shown and its bearing on the whole noted. It is a fact, however, if tonnage is unbalanced, and a reduction of 15 per cent in the average tons per train be made, the train density will increase 30 per cent. The important thing to watch when a reduction is made, say for the purpose of cleaning up a congestion, is whether the increased speed between terminals with less tonnage, combined with the mechanical and terminal delays enables the production of an increase in gross ton miles per day with given power? Secondly, what is the variation in tonnage and cost?

For the purpose of simplifying as much as possible we will disregard expenses incident to maintenance of way, traffic, general and fixed charges, such as supervision, station service, etc., confining ourselves to those items which are appreciable and readily allocated, such as engine repairs, car repairs, wages of engine and trainmen, fuel, water and lubrication. It also includes interest on locomotive at 6 per cent and depreciation at 5 per cent, and interest on the caboose at 6 per cent and depreciation at 4 per cent.

	In Direction Traffic. Consolidation Locomotives.		
	Slow Frt.	Fast Frt.	Per cent variation
Percentage distribution of time:			
Mechanical department	34.84	37.19	.....
Terminal	33.37	31.44	.....
After call time	0.98	1.18	.....
On road running	23.22	23.73	.....
On road running	(5.6 hr.)	(5.7 hr.)	.....
Road delays	5.59	6.46	.....
	100 per ct.	100 per ct.	.....
Miles per locomotive day	83.5	80.5	Dec. 3.5
Miles per hr. when running	19.2	20.9	Inc. 9.
Miles per hr. between terminals	14.5	16.3	Inc. 12.
Per cent efficiency engine loading	91.7	68.6	Dec. 21.
Cost per 1,000 gross ton mile, in cents:			
Fuel	12.8	16.6	Inc. 29.5
Wages train and engine crew	13.6	16.8	Inc. 22.
Total, as above outlined	40.3	50.1	Inc. 24.
Cost per train mile in cents	61.5	57.	Dec. 7.3
Gross ton miles produced per day	153,968	130,000	Dec. 15.2
Cost car repairs at $23.10 per 1,000 G.T.M.	$35.40	$30.00	Dec. 15.2
Cost trans. service and repairs as above	62.00	65.00	Inc. 4.8
	$97.40	$95.00	Dec. 2.5
Add equivalent value per diem on 33 cars at 28 cents per day deducting 17 cents for repairs based on 25 miles per day at 7 mills per mile		9.24	
		$104.24	Inc. 9.3

From the above exhibit, it would seem that regardless of the fact that the reduction of tonnage enabled the fast freight trains to get over the road at an increase in speed of 9 per cent when running and 12 per cent between terminals, combined with a reduction in terminal delay, the mechanical department was unable to turn the power promptly enough and the net result of such handling was a decrease of 15 per cent in the gross ton miles, equivalent to $70.46 decrease in gross freight revenue, an increase in engine repairs and transportation service cost of 24 per cent, a decrease in cost of car repairs, but an increase in loss of use of cars, making a net loss from all the items considered of 9.3 per cent. Regardless of the above, it should be noted that the cost of engine repairs and transportation expense was 7.3 less per train mile.

Comparisons along the basis above outlined made between engines of different types, say Consolidation, Mikado or Mallet, would undoubtedly reveal interesting information, providing it was kept currently and not spasmodically when all concerned were keyed up to concert pitch. Tests made under such conditions are not typical, nor do they generally extend over a sufficient length of time to really be comparable. I have seen cases where engines with 44 per cent greater capacity when in slow freight service with relatively the same loading efficiency as the smaller engines would yield under stress of traffic but 9 per cent more gross ton miles per day. When put in fast freight service they would yield 21 per cent more than the smaller engine, indicating that the larger engine was able to produce more ton miles when assigned to fast freight service. But what about the effect on the track, bridges and equipment and cost of operating at high speeds versus slow speed. Surely the field is a large one and the opportunities inviting.

In view of the fact that the mechanical department necessarily must hold the power for some time, and that when all other factors remain the same, the running time diminishes rapidly as the distance between terminals decreases, it would seem that special attention toward keeping the engines on the road by changing crews without roundhousing would be worthy of investigation, as many divisions are 150 miles long. If engines can, and they do, make successful trips of that length, can it not be stretched another 50 and make "turn around" engine runs with pooled crews, getting 200 miles out of an engine between roundhousing instead of 100 miles on divisions of that length. Suppose we assume a division of 100 miles where the engines now are being roundhoused at the end of every trip and the average detention is 8 hours. If we could eliminate the mechanical delay of one roundhousing and turn the engine promptly upon arriving, allowing the transportation department two hours for call time, and 25 per cent longer for the roundhouse work when the engine gets back to its home terminal, this would increase the utilization per day 12 per cent and not involve any modification in tonnage or expense. This is on the assuming, of course, that the power is turned out in proper shape, as there would be no economy in slighting the work in the roundhouse or shop and have it reflected in an increase in cost of transportation which would more than offset it. There is surely no more economical investment than power well kept up. It is by far the largest element in fuel economy.

While I may seem to have specialized on the mechanical department detention, there are other directions where economies can be obtained and the results just as clearly shown, such as despatching, coal and water stations, passing tracks, telegraph or telephone offices, sufficient crews, schedules of trains and many others. Station work can be checked to determine when it is more economical to put on a switch engine than it is to have the

road crews do the work and so on ad infinitum. I trust this rough outline may raise questions and bring out some new thoughts which will suggest other ways through which we can obtain a better understanding of the transportation problem and the real value of a locomotive.

ACCURACY OF GRAIN WEIGHTS*

By F. C. Maegly

Assistant General Freight Agent, Atchison, Topeka & Santa Fe, Chicago, Ill.

Weighing, grading and remitting are the three principal problems of the grain shipping business. There should be a closer understanding between the shipper, carrier and receiver of grain concerning these three problems. The carrier is really a partner of both the shipper and the receiver of grain. Carelessness, error, or cheating on the part of anyone of these affects all.

Many shippers and receivers provide themselves with suitable grain weighing scales, and safe elevator equipment between scales and cars at the points of loading and unloading. Where such shippers and receivers weigh the entire contents of each car with care and accuracy, and are careful to properly apply the cooperage, the grain shortage evil is conspicuous by its absence.

The carriers usually weigh grain en route upon their first most convenient track scale. The net weight so determined, by the use of gross, marked tare, and a proper allowance for the grain doors used, is sufficiently accurate for the purpose of assessing the carriers' freight charges, but is not sufficiently correct for buying and selling grain.

The buyer and the seller of grain almost invariably agree upon the terms of sale, both as to grades and weights—that is to say, either the shipper's or the receiver's, or some other agreed or established weights and grades, govern the transaction. Even in the case of cross-town movement of bulk grain, where the opportunity of loss from the car is practically eliminated, the buyer and seller agree either that the loading or the unloading weights shall govern.

If the shipper and the receiver would be more inclined to make a confidant of the carrier, checks to prove the efficiency of both the loading and the settlement-term weights could then be made more positive. For example, if the carrier's agent were given a carefully ascertained shipper's loading weight, and the information that the shipment has been sold on the basis of receiver's unloading weight, efficiency tests could be developed which would soon develop the prevailing accuracy of such weights, and particularly of the controlling weight. Such tests would be made with extraordinary care.

Various grain shipping organizations are now recommending that shippers provide themselves with scales of recognized standard, and with elevator loading and unloading equipment that is safe against possible loss or confusion of weights between scales and cars; so that a shipper's certificate of loading weight may be furnished with the shipping instructions for each car shipped; such certificate to show the scale, the dates and drafts weighed, the total weight, the signature of the weigher, and a positive declaration identifying such actual weights with the car and shipment.

Each shipper should maintain permanent and complete record of all of his weights of first entry, and should enter upon such record for each car the outturn reported to him by his customers. The shortage or the overrun, as the case may be, should be extended for each car. The receiver of grain should also maintain a complete and permanent record of all of the unloading weights for each car, and to carry out the program of co-operation, the receiver also should furnish the carrier's delivering agent promptly with a written certificate, or declaration of his unloading weights, said certificate to set forth the scale, the dates and drafts weighed, the total weight, the signature of the weigher, and a positive statement identifying such actual weights with the particular car and shipment. Under such a plan, the carrier would be in the strongest possible position to co-operate to the full limit with shipper and receiver, in the effort to bring about the elimination of error and the establishment of the proper standard of accuracy.

The grain carrying roads are giving serious thought to this problem, and I am sure that it will be solved with the co-operation of the grain-shipping and receiving organizations. For over two years experiments have been tried by means of an extra slip carried with way-bills for bulk grain, the same showing: (1) The name of the shipper, station, elevator, scale, car number and initials, car inspected by, and the shipper's certified loading weight. (2) The in transit record of railroad track scaling; the leakage and loss of grain from car, if any, and (3) the consignee, destination, scale and declared unloading weights.

It is contemplated hereafter to have the delivering agent extend the difference between the shipper's and receiver's declared weights, and to require the prompt investigation of excessive discrepancies; but to intelligently investigate excessive discrepancies, the carriers must have a prompt report of the shipper's loading and unloading weights. To this end, the shippers and receivers must provide suitable scales and elevator loading and unloading equipment that is safe against loss or mixup of weights, between cars and scales, at both ends of the transit.

The carrier's record referred to is yet in the experimental stage. It is returned by the destination agent to the proper officer on whose district the shipment was loaded, so that after the lapse of a short time the carrier has before it the history of the accuracy, or inaccuracy, of the weights declared by each shipper of grain. To make that record more effective, and to provide a proper stimulus for greater effort to each individual shipper and receiver, would it not be desirable to have a medium to which the data made up from such cumulative record could be submitted, if necessary, for an expression of approval, or for recommendations as to means necessary to improve results that are not creditable? The comparisons referred to are rendered more valuable by various efficient and impartial grain weighing departments at several of the important grain centers, like Chicago, Kansas City and St. Louis. At the markets named, the existing Board of Trade organizations have established efficient grain weighing departments. An impartial competent tally weighman is present and actually witnesses and records every weight certified by such weighing departments. At busy elevators, in addition to the tallyman stationed at the hopper scale, another tallyman is located down stairs to check the condition of each car, and to supervise its complete unloading and the sweeping of the entire contents into the elevator unloading pit, and delivery to the hopper scale, before the signal to weigh is transmitted from the downstairs floor to the weighman who is located in the top of the elevator. These tallymen are fortified by suitable Board of Trade regulations.

Let us join in a campaign to call every weight by its right name. If it is the shipper's weight, let us call it "shipper's weight." If it is a board of trade weight, let us make sure that it is in fact a weight witnessed and recorded by an efficient, impartial board of trade tallyman. If it is a state weight, let us make sure that an impartial, efficient employee of the state, not interested directly or indirectly in the shipment, actually performed the weighing, or tallied and recorded the weight. If it is a shipper's or receiver's weight, covered by an agreement between shipper and carrier's weighing bureau, let us call that weight the "shipper's agreement weight," or the "receiver's agreement weight," as the case may be. But do not let us fool ourselves, or each other, by calling weights by any other than their real names.

A bill was recently introduced in one of the state legisla-

*Abstract of a paper read before the Kansas Farmers' Cooperative Grain Dealers' Association, Wichita, Kan., March 3, 1915.

tures, requiring the carriers to install a railroad track scale at every station producing 100 or more cars of grain per year. The advocates of this legislation had figures to show that 400 additional track scales would have to be installed by the railroads operating in the state referred to. The total cost of said scales would be approximately $1,500,000, on which the annual interest at 5 per cent would be $75,000. The annual cost of up-keep would exceed $75,000 additional and the annual taxes would be considerable. The cost of the time lost by trains and switching crews in pulling cars to and from the scales and spotting them at industries would add another very great item, to which we must add the delay to all the other freight while passing trains are occupied with such weighing service; also, the expense and interruption to the industries themselves by pulling the cars away from their plants, in order to get to and from the scales with other cars to be weighed, whether for the industries so disturbed or their neighbors.

And then a very large percentage of the shippers located at these 400 additional track scale stations would continue to invoice their grain on the basis of their own and not the track scale weights; and they would continue to sell their grain, as at present, on the (usually destination) weights and grades per agreement between buyer and seller. One state having such a law on the statute books has proved the accuracy of the statement just made, in that the grain shippers who are located at stations equipped with railroad track scales do not use the railroad weights for invoicing purposes.

THE CITIZEN'S RESPONSIBILITY*

By Frederic B. Lincoln
General Superintendent, Erie Railroad

Civic responsibility, as the question resolves itself today, looks a good deal like individual responsibility. The railroads have been making a strenuous attempt lately to enlist the interest of the people in the economic questions connected with the relations of the public to the carriers, but with not very encouraging results. There is not as yet much evidence of comprehension on the part of the people most affected. The general public seems to have but little realization of the extent to which the transportation problem affects the individual citizen. Transportation is the second greatest industry in the country and engages the energies of a fourth of our population. Even the simple question, that of reasonable passenger and freight rates, but a part of the broader problem, has but little attention given to it by the average busy professional or commercial man.

The interdependence of business and transportation and all the important commercial interests, is, however, self-evident when one examines the facts and the observing citizen must agree that co-operation between different interests is of the utmost importance. Co-operation thus far has been greatly lacking. The remedy is simple; the only demand upon the business man is that he give these matters a moderate amount of attention. A very little real study will put his thoughts in the right channel.

The question needs to be studied on broad lines; commerce is subject to regulation by 48 states and the federal government. At present there is very little harmony. It is the duty of the citizen, through the law makers, to cure this defect.

Are you and your neighbors in Newark and Texas and Paterson and Oregon and Passaic and Chicago—for you are all neighborhood friends in this matter—are you going to let this thing drift as it has in the past, or are you going to further perfect this representative organization of yours and through it strengthen the hand of your State Chamber of Commerce and make that a moving spirit in that increasingly powerful body, The Chamber of Commerce of the United States of America, to the end that through active and intelligent organization some reasonable restraint may be put upon class legislation that is almost wholly responsible for the halt in our country's development and the business depression we are facing today? Above all, are you, as average citizens, going to apply to these transportation questions the small measure of time and thought necessary to insure an intelligent direction to those charged by you with legislating the business and social welfare?

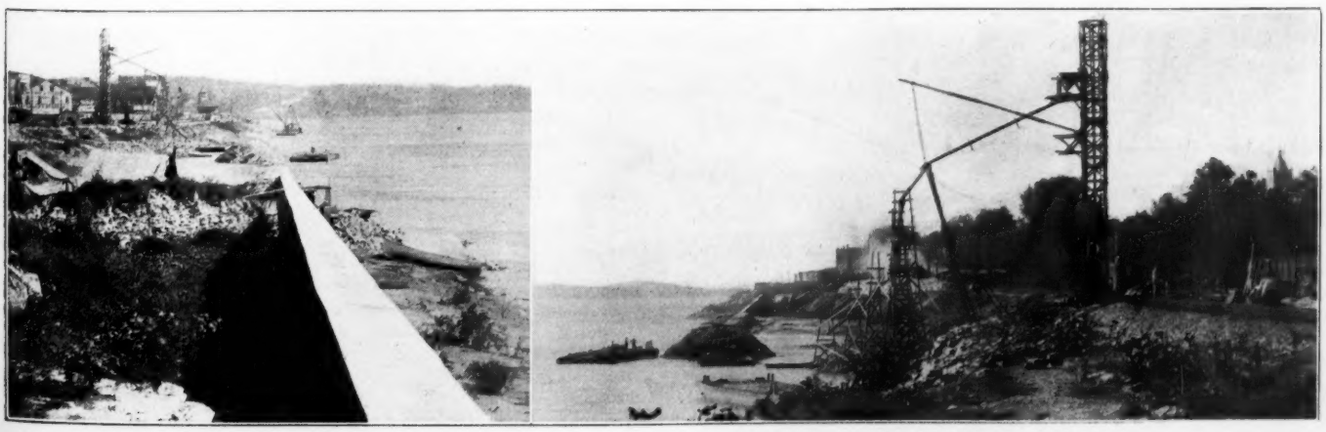
*From an address before the Nutley Board of Trade, Nutley, N. J., April 8.

FRISCO SEAWALL AT CAPE GIRARDEAU, MO.

The St. Louis & San Francisco is now reclaiming a considerable area from the Mississippi river at Cape Girardeau, Mo., permitting the straightening of the main line and providing more space for yard and team tracks. At the present time the river makes a considerable indentation at this point and the tracks follow closely around the foot of the bluff. The improvements consist of the construction of a concrete wall out in the river 600 ft. long at the north end and 600 ft. long at the south end with a heavy rip-rap wall 620 ft. long between. The area between this wall and the present tracks will be filled, after which the tracks will be laid on the new location and a new depot erected. A considerable area will also be given over to the city for park purposes across the track from the station and also immediately south of the station.

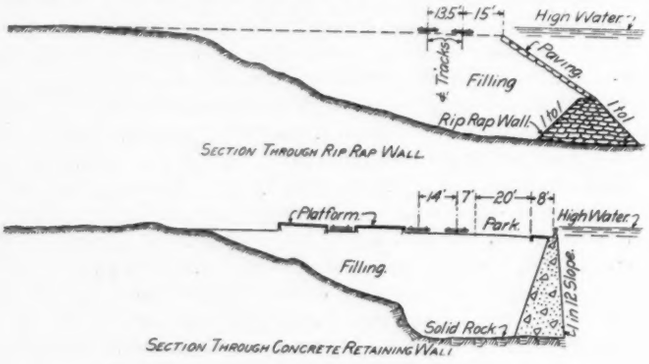
The concrete wall, which varies in height up to 37 ft., is of a plain gravity section 3 ft. wide on top, requiring a total of 11,000 cu. yd. of concrete. It was built in a maximum depth of water of 13 ft. The concrete was mixed adjacent to one of the tracks on shore, elevated by a tower and spouted into bottom-dumping buckets on a barge on the water. These buckets were then picked up by a derrick on the barge, lowered into forms and opened. The wall at the north end opposite the station is surmounted by an ornamental concrete balustrated protecting a sidewalk.

The rip-rap wall which is located in the water for the entire



View of Concrete Wall and of the Construction Outfit

distance is 6 ft. wide on top and has a maximum height of 20 ft., with a slope of 1:1 on each face. While the concrete wall is located parallel to the track with its top 3 ft. below the top of rail, the rip-rap wall is located on the slope line some distance out in the stream with its top a maximum of 24 ft. below the



Typical Sections of Wall and Embankment

top of rail. On the completion of the wall and of the filling behind it, the slope above the wall will be paved with rip-rap on a 1½:1 slope.

This improvement, which is estimated to cost about $240,000, is being handled under the direction of F. G. Jonah, chief engineer of the St. Louis & San Francisco.

THE CHICAGO, ROCK ISLAND & PACIFIC RECEIVERSHIP

On the application of the American Steel Foundries Company President H. U. Mudge and Jacob M. Dickinson were on April 19 appointed receivers of the Chicago Rock Island & Pacific Railway Company. This is the owning and operating company.

T. M. Schumacher, chairman of the Chicago, Rock Island & Pacific Railway, has issued the following statement:

"The appointment of receivers for the Chicago, Rock Island & Pacific Railway Company by the U. S. Federal Court in Chicago upon the application of creditors was assented to by the president of the railroad because of the absolute inability of the president or the company to give assurances to creditors that their obligations would be met when due.

"Just previous to April 1 in order to meet requirements of $1,600,000 on that date, strenuous efforts were made to secure from various banking institutions in New York a temporary loan. This loan was finally secured at the last moment by the personal endorsement of five of the directors. It is apparent that the company cannot continue raising funds by such a method.

"It is necessary to obtain approximately $2,000,000 on May 1, and with a much less active and attractive collateral from a banker's standpoint upon which to borrow. Furthermore, on July 1 an additional $2,000,000 will be necessary. The short time loan of $2,500,000, due April 30, would only be renewed by the present holders upon absolute assurance from the board that its finances for the balance of the calendar year 1915 have been arranged.

"As such assurance could not be given, it would have been necessary also to meet this $2,500,000 on April 30, making a requirement of $4,500,000 on that date.

"It is very essential for the proper development and economical operation of this property that many grades should be reduced, that a large amount of new steel rails should be immediately laid for the safety of both passenger and freight traffic, and that 5,000 freight cars should be ordered. While car equipment notes could be issued for 80 per cent of the cost of the freight cars, $1,000,000 would be required for the other 20 per cent.

"A receivership at the present time is merely to obtain the protection of the court that the company's physical condition and equipment may be improved, its temporary loans continued and an opportunity be given for working out a comprehensive and permanent plan for financing to preserve for the shareholders the valuable equity believed to be in the property.

"Stockholders should not be confused nor led into the belief that this appointment of a receiver means any immediate foreclosure of the property or the immediate assessing of the stock. It simply means that the way is being prepared for the working out, as above outlined, of some comprehensive plan which will permit this property to grow and expand on good, sound lines to the ultimate benefit of the shareholders."

Answering the American Steel Foundries' petition, the Chicago, Rock Island & Pacific Railway admits each and every allegation of the bill of complaint, and adds:

"Believing it to be its duty to its officers, directors and stockholders to protect its property and business and to treat the same as a trust fund for the security of its creditors and stockholders, the company hereby consents to the appointment of receivers of all its property and consents further that such receivers take possession and operate all such property under order of this court."

The petition of the American Steel Foundries Company sets forth that the creditors are so scattered that it fears isolated attachment suits to the injury of the propery as a whole, so that it might become disrupted and disorganized, whereby security holders and the public would be injured. The complainant frequently demanded payment of $15,818 due to it for materials furnished the railway, but the company pleaded financial inability to pay. Continued operation as an entity under this court's protection is essential to its ability to pay hereafter. Interference of a court of equity for the protection of its rights and the rights of all parties in interest is immediately required, and there is a necessity for immediate appointment of receivers.

N. L. Amster, who was elected a director representing the minority interests, is quoted as saying:

"I would call this Rock Island receivership a huge joke if it were not for the fact that it has brought untold hardship and loss to thousands of innocent and helpless investors.

"The company has never in its history been less in need of a receivership than at this time. The physical condition of the property is now universally admitted to be in better shape than ever before. The earnings of the company, according to the last statements filed with the Interstate Commerce Commission, are far in excess of last year, and larger than ever before. This too in face of the business depression through which we have passed the last year. Now, with business expansion and general prosperity, on the threshold of which this country is just entering, everybody admits that the railroad earnings will be greatly increased. How, in the face of all this, the management could consent to a receivership is beyond my comprehension, and such action is entirely opposed to my feeling in the matter.

"I have practically arranged for a two year $6,000,000 loan, secured by $11,400,000 of the company's refunding and other good negotiable bonds. This would have paid off this $2,500,000 Central Trust loan, the $1,494,000 Choctaw serial notes coming due May 1, and the $1,600,000 Bankers Trust Company loan coming due in September, and would have put the company beyond any possibility of straining any of its securities, but this receivership has put a wet blanket temporarily over this negotiation."

The Chicago, Rock Island & Pacific has a $2,500,000 note, due April 30, and has maturing May 1, $1,494,000 gold bonds of 1912. The June requirements are very small, but in July they exceed $3,000,000, with $4,500,000 more maturing before the end of 1915. The following table summarizes interest and principal maturities up to and including July, 1916:

1915		1916	
May	*$4,997,700	January	$2,739,000
June	104,500	February	8,377,300
July	3,195,000	March	247,500
August	884,900	April	2,602,900
September	247,500	May	2,165,100
October	2,608,800	June	104,500
November	962,400	July	3,176,100
December	83,500		
		Total	$32,496,700

*Includes the $2,500,000 note due April 30.

The above total of $32,000,000 includes $11,600,000 of equipment trust and short term indebtedness.

An Effective Freight Claim Preventive Crusade

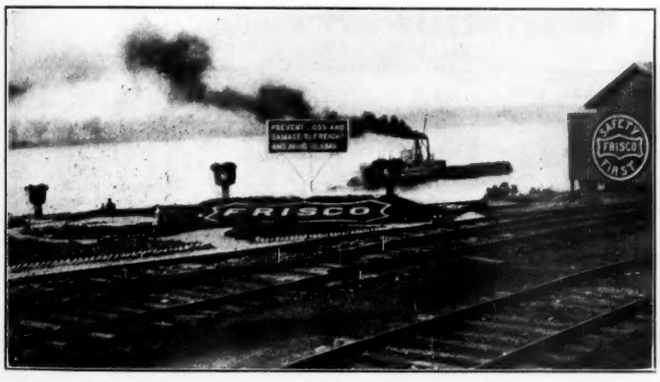
Part III—Some of the Schemes Which Have Helped to Reduce Payments $17,000 a Month Since Last June

In the two previous articles of this series we discussed the early development of the campaign on the St. Louis & San Francisco for the reduction of loss and damage to freight and the organization of the so-called freight claim preventive committees which have stirred the employees over the entire system to exert their individual efforts toward cutting out the useless waste, due in many cases to carelessness or thoughtlessness in the handling of freight.

In this, the third and last article of the series, certain methods will be described which have done much to maintain an intense interest in the campaign, and which are more or less novel. It is comparatively easy to launch a movement of this sort, but the hard fight comes after the first novelty has worn off and the scheme becomes more or less commonplace. This issue has been met squarely and straight from the shoulder. The superintendent of freight loss and damage claims lives on the road, and being on the fighting line, as it were, is able to watch the progress of the campaign critically and to keep a perfect stream of ammunition headed from his headquarters to the men who are responsible for results.

SIGNS

A slogan was first adopted: "A One Hundred Thousand Dollar Reduction in Claim Payments for the Fiscal Year." Then followed the placing of signs at such points on the railroad property as to attract the greatest possible number of those whom it was desired to interest in the campaign. These signs were of various sorts, a typical one reading: "Prevent Loss and Damage to Freight and Avoid Claims." Sign posts were in some cases erected to carry them; in other cases they were placed on the side or the roof of a building; they have even been worked into the designs of the flower beds at the stations. In some instances electric signs have been erected similar to those which are sometimes used in connection with the safety first movement. Signs were also stenciled on the doors of cabooses, and pertinent suggestions were introduced in one form or another on bulletin boards.



A Typical Freight Claim Preventive Sign at the Memphis Yards on the Banks of the Mississippi

RUBBER STAMPS

A number of special rubber stamps were made and distributed over the system to be used on all correspondence interchanged between those who had anything whatever to do with the movement and handling of freight. The first one of these read:

> An ounce of prevention is worth a pound of cure. Watch what you are doing in order to prevent claims.

The wording on several of the more novel of these stamps is reproduced below:

T R Y
T o make a better showing in freight claim payments,
R educe errors—
Y ou can if you try.

☛ There is no more opportune time than the present to better freight handling. Will you help?

☛ It is easier to prevent errors in freight handling than to correct them, and it is less expensive too.

☛ 59% of our freight claims are for amounts $5.00 and less. You are interested and can help reduce claim payments by watching the small leaks.

> Loss and damage freight claim payments is 3.2% of total transportation expense. Help reduce this large item.

Don't talk war; talk claim prevention.

> Careful marking and packing of freight will prevent its becoming lost or damaged.

Freight is half way there when properly marked and packed.

REMINDERS

Closely allied to the messages on these stamps were an extensive series of brief reminders. These were printed on small sheets of paper and as in the case of the rubber stamps were sent out from time to time during the progress of the campaign. In some instances the value of the reminder lay in the terse way in which the message was conveyed; in others it might lay in the peculiar arrangement or wording. Reminder No. 4 was of this sort and read as follows:

A great many claims are
V ery easily overcome
O n all railroads
I f the employees
D ecide to co-operate.

C ut down
L oss and damage
A nd prevent claims
I n all classes of freight.
M any claims are caused by
S mall irregularities which can be corrected.

Reading down the first line of each of these two arrangements we have the words "Avoid Claims," the letters being bold face in order to throw these two words into relief.

Reminder 330 was of a similar type but designed to emphasize the advisability of promptly filling out and sending in the postal cards which were referred to in the second article of this series. It read as follows:

P revent claims by filling out the cards
O f every case or bad situation you know should be corrected.
S end the cards to your Preventive Committee.
T ake time to do this on every case you run across.
A stitch in time will save nine.
L et us all work together—claim prevention.

C atching errors should be our aim, and a $100,000 reduction in claim payments will be easy.
A sk your Freight Claim Preventive Committee for a supply of cards if you have none.
R ough handling of freight cost us last year $70,593.82.
D efective cars cost us last year $72,544.12.
S ee if you cannot help us to cut this down by reporting all bad cases on the cards.

Other typical reminders were:

No. 282—Are you aware that loss of package freight cost the company $60,000 last year? Help to reduce this; see that each and every package is plainly and properly marked.

No. 340—Errors may sometimes not cause claims, but they cost us money in the way of stationery which otherwise would be saved. Watch this leak.

No. 342—Claim prevention is something to which we can all contribute our efforts with good results. Considering the fact that 59 per cent of all claims received are for amounts of $5 and less, you will readily see that close co-operation is necessary. Help reduce claim payments $100,000 this fiscal year.

A large number of these reminders were suggested by committee men or interested employees. The following acrostic was developed on the River and Cape division and was used by the freight claim preventive committee to good advantage:

P revent loss and damage to avoid claims.
R ough handling of cars causes claims.
E veryone is urged to do their part.
V ery few cards are being turned in by yardmen; let us hear from you.
E arnest co-operation is desired from all employees.
N o discipline will be applied for matters reported to the committee.
T his company paid out $435,503.91 in claim payments in the fiscal year of 1913-1914.

C laims are costing this company over $2 for each minute of each working hour, 26 days per month.
L et each one of us remember the slogan: "Reduce Claim Payments $100,000."
A void claims and have better satisfied patrons.
I n reporting small matters, much good can be gained.
M oney saved in claim payments means reduction in transportation expenses.
S witchmen, will you do your part?

BULLETINS

In addition to these reminders, circulars and bulletins were sent out at more or less regular intervals. Claim bulletins addressed to agents, train and yard employees called attention to certain specific abuses which had come to the attention of the claim department and which could have been avoided with a little effort or by a more intelligent handling. Typical paragraphs from two or three of these bulletins follow:

We recently paid four claims for damage to bottles moving in as many cars and earning in revenue less than $300. These claims were filed for breakage which could be the result of nothing except rough handling in transit inasmuch as the bottles were carefully packed and properly loaded and braced under the supervision of employees of this company. The four claims aggregated approximately $550 and left us heavy losers on the traffic handled. In this case carelessness somewhere proved very expensive.

We were required to pay $131.76 for damage to 300 sacks of cotton seed meal loaded in a defective car. Car Inspector at point of origin passed the equipment as fit for this loading and his employer, the company, had a right to expect that the roof would protect the consignment to its destination. However, on arrival at destination, almost the entire load was found to be watersoaked from a leaky roof which Car Inspector at that point declared to have been of long standing, and it was necessary for us to pay the amount mentioned. Surely, the car could not have been in first class condition when originally loaded although it was passed as such.

A car of cotton seed oil recently delivered us in switching service was hit hard enough in the terminal to shift the tank on car frame, breaking steam pipe and requiring transfer. Loss of oil and cost of transfer amounted to nearly $100 which was caused entirely by carelessness in switching.

A claim was recently filed on a car of plate glass which moved about 450 miles without noted exceptions. In the next 200 miles it was set out five times for rebracing and replacing a shifted load. Glass worth more than $1,700 was broken and claim for its value paid. It is very apparent that the car had unusually rough handling on several occasions after it was first set out for rebracing, or the employees repairing the braces performed their duties in a very inefficient manner. Needless to say the loss could have been avoided had every one given this car of glass the same careful handling and attention that would have been given it had it been the property of those who were handling it.

Another series of circulars sent out by the superintendent of freight loss and damage claims is addressed specially to agents and concerns the proper methods of classifying and handling certain commodities, such as eggs, poultry, food products and a variety of commodities which require special attention both as to packing and handling.

EDUCATIONAL BULLETINS

Possibly the most interesting and inspiring of the different series of circulars are those known as "educational bulletins." These are largely suggestive and ordinarily are short and to the point. The following extract from Bulletin 4, for instance, cites certain specific instances where serious damage was avoided, thus preventing claims for loss or damage.

This office has issued periodically claim bulletins showing specific cases where the Frisco has paid out money in freight claims due to transportation errors, and I am thinking that it would be well to issue a circular covering cases where on account of activity of employees, claims have been prevented.

Not long ago my attention was called to a case where a conductor was ordered to pick up a car of race horses for a short haul; after putting the car in the train it was found that it was off center. Conductor immediately decided that it would not be safe to move; shipper offered serious objections to any delay, claiming horses were scheduled for a certain race meet, and further objected to transfer to the only available car, which was a stock car, claiming horses would catch cold. At the conductor's very timely suggestion, blankets were produced by shipper, stock car lined with same, horses transferred and handled forward with but one hour's delay, obviating a claim on a carload of high priced animals.

An employee at one of the smaller stations noticed a car of wheat in a

Prevent Loss and Damage to Freight and Avoid Claims

MY AIM IS

IMPROVEMENT OF THE SERVICE

BY

LOADING—No defective cars that would result in damage.
STOWING—Packages properly, giving consideration to weight, shape, size, nature of contents and station order
TRUCKING—With trucks not loaded too high or too wide so that they are liable to bump against warehouse door or car door and topple over, making certain the freight is so loaded that it will rest secure until it reaches car or warehouse, as the case may be.
CHECKING—Freight carefully to see it is properly marked and packed in accordance with classification requirements, and that shipping ticket or bill of lading is legible and complete.
BILLING—Legibly all articles shown on ticket or bill of lading.
HANDLING—Cars carefully, avoiding carelessness in starting and stopping trains and in switching.
DELIVERING—Freight only to authorized persons, using care to safeguard the Company's interests
PREVENTING—Loss and damage to freight, thereby avoiding claims.
REMEMBERING—That better transportation means better pleased patrons and more business for the Frisco.

"YOUR CO-OPERATION IS REQUIRED IN ORDER TO REDUCE CLAIM PAYMENTS $100,000.00"

A Heavy Card of About This Size and Bearing the Above Inscription Was Distributed to Advantage in the Early Stages of the Campaign

passing train leaking grain; he flagged the train and had the conductor set car out; repairs were made and further loss avoided.

At one of our larger stations, a shipment of household goods was received, with certain pieces in bad order; claim clerk called upon a repair man to ascertain the cost of repairs, and was informed as to what the cost would be including certain material. He was further told that the material necessary would be furnished free of cost, providing our forces at the platform made the repairs. The proposition was readily accepted by the claim clerk, and the broken pieces repaired, with all cost eliminated.

A mixed car of stock with partition broken, was noticed moving through a terminal; car was set out, partition repaired promptly, and a heavy claim no doubt avoided as the bad condition was noted before any of the animals had become injured.

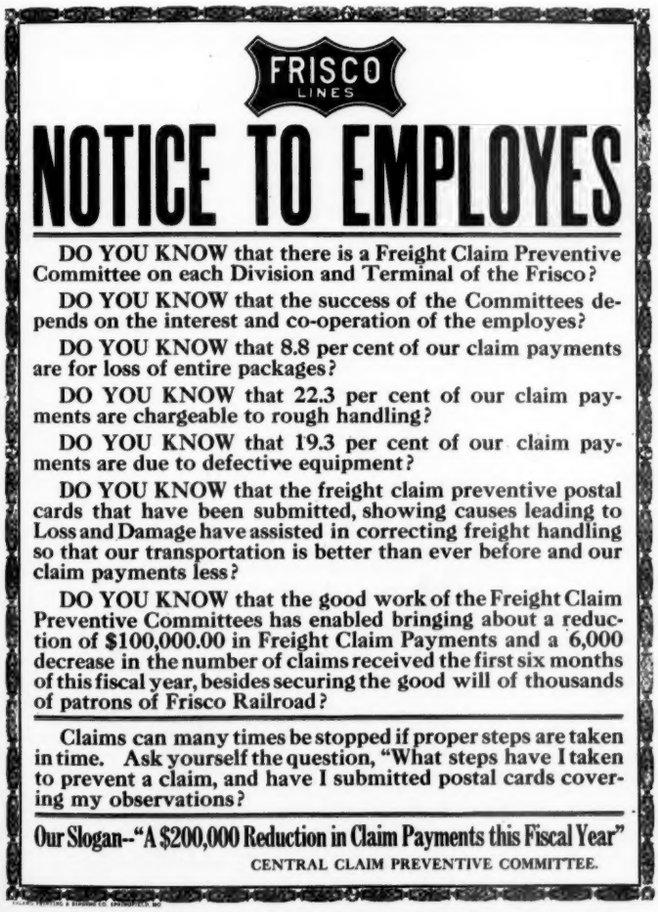
I have just received a bad order report from one of the larger stations covering damage to flour and bran account wet. Check of contents shows 28 sacks of flour more or less damaged. Delivering agent carefully inspected the shipment, and advised consignee that he would take up the damaged flour and pay him invoice price for it, at the same time making arrangements to sell all of the flour at invoice price, thus avoiding any loss.

Owing to the alertness of one of the receiving clerks at a large platform, claim was avoided account of shortage to a shipment of coats. When shipment was received, receiving clerk noted case had appearance of having been opened, and refused to sign for shipment until invoiced. The result was we have an actual check of contents of the shipment when received, and are in position to decline claim when presented.

It is the kind of interest shown in the above mentioned cases that is going to assist in bringing about the $100,000 decrease in claim payments this fiscal year. I hope each will give claim prevention careful consideration and endeavor to contribute his share towards the reduction mentioned.

Circular No. 7, addressed to all employees who have to do with the handling of freight, was more extensive and outlined 37 physical causes which lead to loss and damage. Extracts from this circular follow:

I wish to call your attention to the 37 items noted below, which are the principal causes that lead to loss and damage claims. They are not listed


FRISCO
LINES
NOTICE TO EMPLOYES
DO YOU KNOW that there is a Freight Claim Preventive Committee on each Division and Terminal of the Frisco?
DO YOU KNOW that the success of the Committees depends on the interest and co-operation of the employes?
DO YOU KNOW that 8.8 per cent of our claim payments are for loss of entire packages?
DO YOU KNOW that 22.3 per cent of our claim payments are chargeable to rough handling?
DO YOU KNOW that 19.3 per cent of our claim payments are due to defective equipment?
DO YOU KNOW that the freight claim preventive postal cards that have been submitted, showing causes leading to Loss and Damage have assisted in correcting freight handling so that our transportation is better than ever before and our claim payments less?
DO YOU KNOW that the good work of the Freight Claim Preventive Committees has enabled bringing about a reduction of $100,000.00 in Freight Claim Payments and a 6,000 decrease in the number of claims received the first six months of this fiscal year, besides securing the good will of thousands of patrons of Frisco Railroad?
Claims can many times be stopped if proper steps are taken in time. Ask yourself the question, "What steps have I taken to prevent a claim, and have I submitted postal cards covering my observations?
Our Slogan--"A $200,000 Reduction in Claim Payments this Fiscal Year"
CENTRAL CLAIM PREVENTIVE COMMITTEE.

An 18-in. x 24-in. Poster Used in the Educational Campaign

in the order of their relative importance. You can study these items with profit to yourself and to the company:

1. Rough handling in starting and stopping trains, in switching at stations, on the road, and particularly in yards.
2. Damage caused through improper stowage.
3. Livestock and perishable freight delayed in transit.
4. Failure to re-ice perishable shipments properly before starting and while in transit.
5. Loading freight liable to be damaged by water in cars with leaky roofs, or cars that are not otherwise water tight.
6. Freight stolen in yards, in transit and in depots.
7. Failure to keep proper seal record of cars received from connecting lines and otherwise.
8. Failure to properly check freight to and from drays and to and from cars.
9. Rough handling of freight by employees in loading and unloading from cars.

ST. LOUIS AND SAN FRANCISCO RAILROAD

Prevent Loss and Damage to Freight and Avoid Claims

MY AIM IS

IMPROVEMENT OF THE SERVICE

"Your Co-operation is Required in order to Reduce Claim Payments $200,000"

Inscription Which Appears on Frisco Blotters for Use of Employees and Patrons

10. Failure to properly inspect cars before permitting them to be loaded with grain, to know that they are in fit condition.
11. Failure to record on waybills and make report of all freight damaged, over and short.
12. Signing bills of lading without positive knowledge that freight has been received.
13. Failure to see that all package freight is properly marked in accordance with marks shown on B/L and waybills.
14. Freight damaged in handling.
15. Freight freezing account box car service and failure to note proper exceptions when received.
16. Concealed damages, concealed shortages.
17. Damages account negligence of employees.
18. Damaged when received from connecting lines and no exceptions noted.
19. Damaged when received from shippers and no exceptions noted.
20. Careless checking of freight to and from connecting lines.
21. Frail packages, improper packing, etc.
22. Damage caused through wrecks, derailments, etc.
23. Failure to load into car for which checked and billed, going forward later, but not accompanied by billing.
24. Erroneous and improper loading.
25. Failure to take proper exceptions against freight received not in good shipping condition.
26. Failure to safeguard the company's interest in delivering freight in a damaged condition to consignees.
27. Failure to inspect shipments of live stock and to take exceptions against when received in a damaged condition from connections.
28. Failure to trim down, brace and block off freight before closing car doors.
29. Failure to remove freight on platforms to a safe place when exposed to the rain.
30. Delivering order shipments without surrender of the original B/L.
31. Failure of yard clerks to examine cars before reporting them as empty and to make a list of any packages found in cars.
32. Carelessness in the matter of making and sending out arrival notices.
33. Failure to inspect stock cars before loading to see that they are in proper condition in every way to receive live stock.
34. Failure before loading to properly inspect and clean cars.
35. Claims caused through misrouting and account of incomplete waybills.
36. Failure to compare waybills with bill of lading or shipping ticket.
37. Inaccurate and illegible bills of lading or shipping tickets.

These causes are what we call preventable causes. In other words, if our employees will co-operate along the lines of claim prevention we can reduce claim payments fully 50 per cent, which will mean over $200,000 reduction.

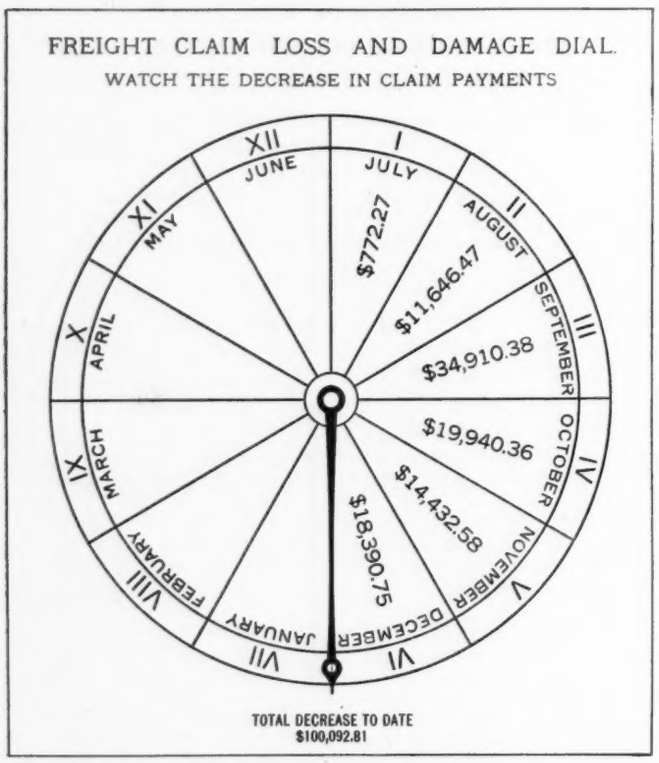
The following paragraph, taken from Circular 8, addressed to all trainmen, enginemen, yardmen, carmen, and others concerned is typical not only of the other information contained in this circular, but as to a large part of the information which is sent out in this way to the various employees engaged in the handling of freight:

Seventy per cent of the claims received are for amounts less than $10. And 60 per cent are for amounts less than $5. Therefore it is the small claims that go to make up the large sum we pay out yearly, and which has averaged close to $500,000 during the past five years. The average

amount of every claim received is $10. Therefore if we bring about a decrease in claim payments of $100,000 we will receive 10,000 less claims. This would mean approximately 20 per cent less work for the employees on this railroad who have to handle correspondence in connection with claims. It would mean less OS&Ds. It would be hard to estimate the amount of labor and stationery saved, but the benefit would be large.

We have already mentioned the co-operation which has been sought from the patrons of the road by inviting them to some of the freight claim preventive meetings. In Circular 9, addressed to the patrons and coming from the office of the superintendent freight loss and damage claims, the freight claim prevention campaign was briefly described and suggestions and co-operation were asked for.

One of the illustrations shows the inscription on a blotter. These blotters have been distributed to all of the employees, and 10,000 have been printed for distribution to patrons. When an agent or traffic department representative gives these blotters to patrons he has an opportunity to explain to them the efforts which are being made to get their freight to destination without loss or damage.



The Dial Bulletin Which Was Issued January 15

Another illustration shows what has been designated as the freight claim loss and damage dial. It shows the decrease in claim payments by months as compared with the previous year and indicates that for the first six months of the present fiscal year a decrease of over $100,000 had been made. It is planned to issue these dials each month until the close of the fiscal year, thus keeping the men posted in a simple way as to the progress which is being made.

The loss and damage pyramid bulletin is also of interest and was issued early in December, 1914, to cover the performance of the previous five months. A large rubber stamp has also been gotten out within the past few weeks and is reproduced in one of the illustrations. It shows that up to February 27, 1915, $146,920.35 had been saved in freight claims as compared with the previous year and that a further reduction of only $53,079.65 is needed to reach the $200,000 mark. Revised stamps will be sent out from time to time as new data is available.

Hand bills have been furnished to the agents which are to be signed by them personally and enclosed with correspondence to patrons. These are apparently securing good results in developing a more friendly feeling on the part of the patrons toward the road. The wording is as follows:

To Our Patrons:

Care and promptness are the chief requisites in handling freight, and by giving first class service in this respect, the Frisco hopes to retain the good will of its patrons.

Our employees having to do with the handling of freight fully realize the annoyance to all concerned incident to loss and damage and have endeavored to remove the causes leading to same; as a result, there is a very large decrease in the number of freight loss and damage claims filed.

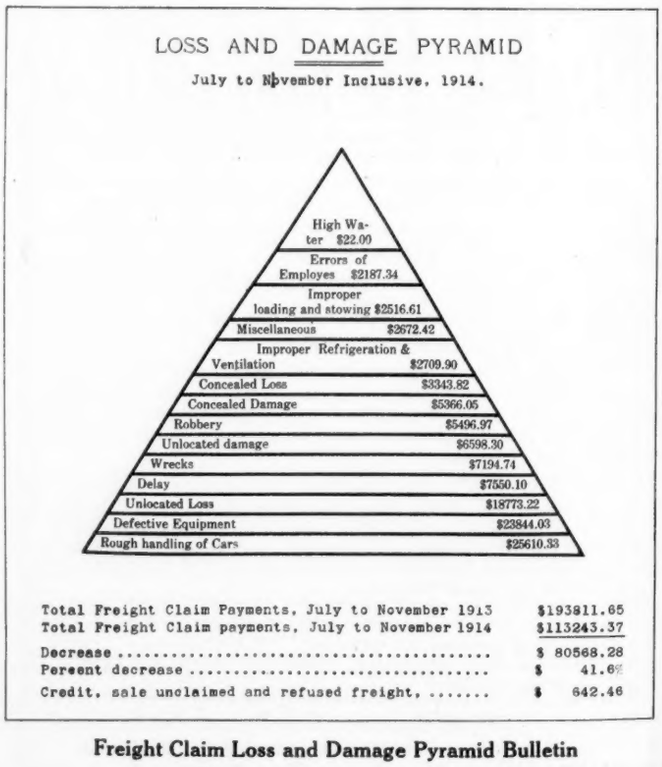
We feel that our patrons will appreciate our efforts towards giving them better service and will co-operate with us in any way possible in removing any causes for loss or damage that come under their control. Particularly can conditions be improved in this respect by seeing that freight that is tendered for shipment is properly packed and carefully marked.

Your suggestions will be gratefully received.

Agent.

A Special Rubber Stamp Used on Railway Correspondence

All members of the freight claim preventive committees have been furnished with business cards similar to the one reproduced herewith, which they are expected to use in the solicitation of business. All of the members of these committees are urged to use their influence in securing business for the road and to interest other employees in this work.


LOSS AND DAMAGE PYRAMID
July to November Inclusive, 1914.
High Water $22.00
Errors of Employes $2187.34
Improper loading and stowing $2516.61
Miscellaneous $2672.42
Improper Refrigeration & Ventilation $2709.90
Concealed Loss $3343.82
Concealed Damage $5366.05
Robbery $5496.97
Unlocated damage $6598.30
Wrecks $7194.74
Delay $7550.10
Unlocated Loss $18773.22
Defective Equipment $23844.03
Rough handling of Cars $25610.33
Total Freight Claim Payments, July to November 1913 $193811.65
Total Freight Claim payments, July to November 1914 $113243.37
Decrease $ 80568.28
Percent decrease 41.6%
Credit, sale unclaimed and refused freight, $ 642.46

Freight Claim Loss and Damage Pyramid Bulletin

Naturally the enthusiastic work of the freight claim preventive committees and the employees has attracted the attention of the press and much desirable publicity has been obtained from the

notices of the progress of the work and the accounts of the meetings which have been held at more or less regular intervals at each of the more important points on the system.

SPECIAL CLAIM PREVENTION DAYS

Handbills were distributed to all employees late in February announcing that the ninth and tenth days of March and April had been set aside as special claim prevention days, the idea being to absolutely prevent on these days errors of any kind which result in loss or damage to freight. In addition to the handbills, rubber stamps were distributed to be used on company correspondence and bearing the message: "Don't forget that March 9th and 10th are special claim prevention days." On March 9 the superintendents sent wires to all freight train crews emphasizing the importance of preventing loss and damage to freight.

On the handbill announcing the special claim prevention days appeared the following reminders:

The RECEIVING CLERK may help by seeing that he receives all the freight he signs for. He is the man to reject consignments improperly prepared for shipment.

The TRUCKER may help by careful trucking, and by being sure that the freight is loaded in the proper car.

The STEVEDORE or LOADER may help by careful stowing and bracing and by supervising the work of the loader.

The CAR INSPECTOR and WAREHOUSE FOREMAN may help by choosing suitable cars for loading, and by seeing that cars selected are free from nails and other projections, and from oil or other refuse which may injure the lading.

The SWITCHMAN may help by avoiding unnecessary movements of the car, by careful signaling, and by making smooth couplings.

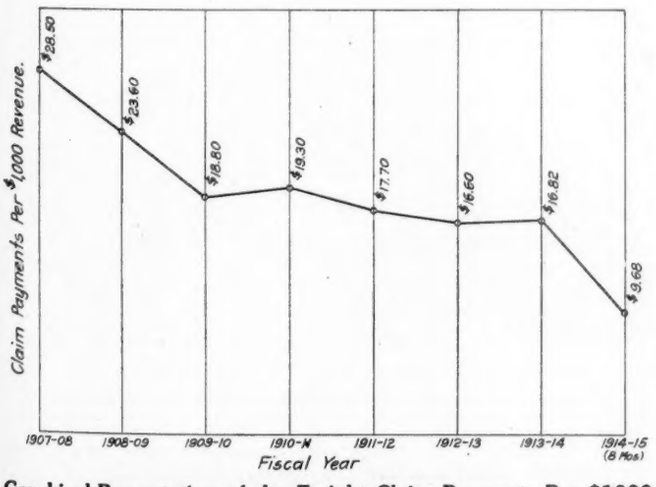
The ENGINEER may help by prompt and careful observance of signals, and by avoiding sudden and hard applications of air.

The CONDUCTOR and BRAKEMAN may help by unloading and loading freight as though it were their own property, being cautious to see that it is put off at its correct destination, and by reporting instances of improper loading.

Thus far the records show that very few claims have been filed for loss or damage which occurred on these days. The plan created much enthusiasm and undoubtedly inspired the employees to greater efforts and resulted in much good. Voluntary reports have been received from a number of stations and employees calling attention to the fact that they did not make any errors in these special days.

SPECIAL MEETINGS

A new scheme is just being tried out, that is the holding of joint meetings of the freight claim committees wherever it is possible. For instance, a joint meeting of the Eastern and the Northern divisions and Springfield Terminal committees was held at Springfield, Mo., on March 24. A goodly number of patrons were present, as well as a large number of employees. Talks were made by general officers, division officers, and employees. This month there will be a joint meeting at Memphis of the Southeastern, the Ozark and the River and Cape divisions and the Memphis Terminal committees. There will also be a joint meeting a little later at Monett, Mo., of the Eastern, the Central, the Kansas, and the Southwestern division commitees.



Graphical Presentation of the Freight Claim Payments Per $1000 Freight Revenue for the First Eight Months of the Present Fiscal Year and for the Seven Previous Years

RESULTS

The results of the freight claim preventive campaign for the first eight months were discussed in the first article in this series and are shown graphically in the accompanying diagram as compared to the records for the previous seven years. The saving in the prevention of friction between the patrons and the railroad representatives and in the reduction in transportation expenses due to the better service which has resulted cannot be estimated, but must have been large. This is reflected by the following data:

FRISCO LINES

NOTICE!

The Slogan of the Freight Claim Preventive Committees has been realized—the $100,000 reduction in Freight Claim Payment has been made.

Our Slogan now is "A $200,000 reduction in Claim Payments this fiscal year." Every dollar of this can be made if each employe will help.

REMEMBER!

Money saved is money made. Stop a leak. Stop a shipment going wrong and last but not least—STOP A CLAIM.

CENTRAL CLAIM PREVENTIVE COMMITTEE

(These were printed in several colors)

One of a Number of Campaign Hand Bills

Claims Received for First Eight Months of Fiscal Year

	1913-14	1914-15
July	3,785	4,627
August	6,441	4,426
September	5,076	4,750
October	5,216	5,262
November	5,336	4,195
December	6,662	4,202
January	5,822	4,289
February	5,126	4,076
Total	43,464	35,827

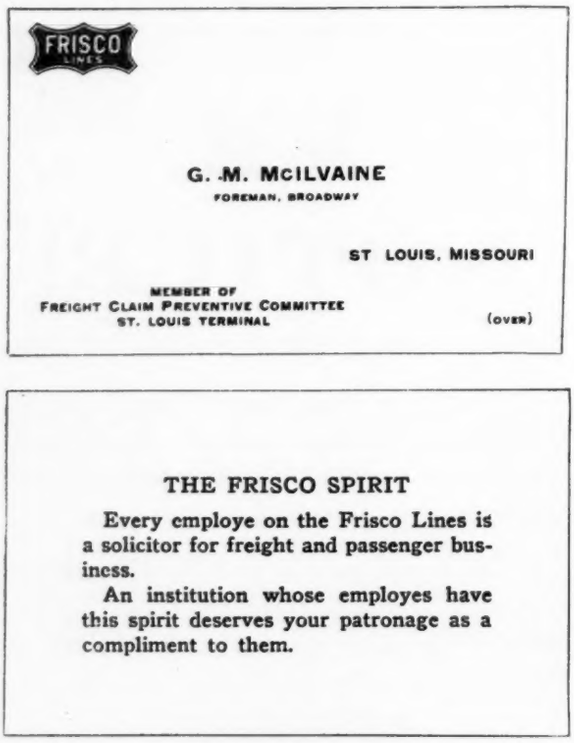
This shows that the number of freight claims for the first eight months of the fiscal year 1914-15 decreased 7,637, or 17 per cent, as compared to the same period for the previous year.

The statement following shows the decrease in the number of

OS&Ds, refused and unclaimed freight reports, and L. C. L. tracers received during the first eight months of the present fiscal year as compared with last year:

	1914-15	1913-14	Decrease	Per cent
Overs	15,955	26,625	10,670	40.1
Shorts	14,858	22,493	7,635	33.9
Damages	35,225	39,054	3,829	9.8
D/Rs	13,826	16,557	2,731	16.5
LCL Tracers	3,590	6,787	3,197	47.1
Total	83,454	111,516	28,062	25.1

In other words about 30,000 fewer investigations were started in the freight loss and damage claim department. This means roughly that from 60,000 to 70,000 fewer letters were sent out


FRISCO
LINES
G. M. McILVAINE
FOREMAN, BROADWAY
ST LOUIS, MISSOURI
MEMBER OF
FREIGHT CLAIM PREVENTIVE COMMITTEE
ST. LOUIS TERMINAL
(OVER)
THE FRISCO SPIRIT
Every employe on the Frisco Lines is a solicitor for freight and passenger business.
An institution whose employes have this spirit deserves your patronage as a compliment to them.

Face and Back of Business Cards Used by Members of Freight Claim Preventive Committees

by that department and that the agents and trainmen have had much less correspondence to attend to. Is it any wonder that they are boosters for the new order of things?

CONCLUSION

In the first article of this series certain statistics were given which indicated that for several years the freight loss and damage claims had steadily decreased on the Frisco per thousand dollars of gross freight revenue until a certain point was reached in 1912-13, beyond which it seemed almost impossible to go. Impressed by the results gained in the educational campaigns which had been waged in the safety first movement and later in the effort to better the train and car loading and improve the freight movement, it was decided to inaugurate a similar effort to reduce the waste due to the loss and damage to freight. It was estimated that it might be possible by a strong effort to save $100,000 in the fiscal year 1914-15. The importance of giving more attention to the education and training of employees is indicated in no uncertain terms by the fact that the goal which was set at a high point (many believed it to be beyond reach) was reached in six months and the indications are that double the saving, which was originally aimed at, will be made. Does it pay to educate employees fully as to their duties and to inspire them by various means to do better and more efficient work? The experience of the Frisco, not only in this campaign, but in the others which we have described during the past year, surely proves that it does.

THE ALASKAN GOVERNMENT RAILWAY

As announced in our issue of last week, the government has selected the route for its proposed railway from the coast into the interior of Alaska and has authorized the inauguration of work at once. The route adopted extends from Seward on Resurrection Bay across Kenai Peninsula and the head of Cook Inlet, ascending the valley of the Susitna river, crossing the Alaska mountains through Broad Pass and then descending the Tanana river to Fairbanks, a total distance from Seward of 471 miles. The Alaska Northern extending from Seward inland 71 miles to Turnagain Arm has been purchased by the government for $1,150,000, or $16,000 per mile. A branch will also be built from Matanuska Junction to the Matanuska coal fields, a distance of 38 miles. A terminal will be built at Ship Creek on Cook Inlet, which will serve as the outlet for the Matanuska coal, and as a base for the construction of the road.

It is expected that about 40 miles of line will be constructed this year. Because of climatic conditions and the difficulty of getting equipment in to the line most of the grading will be done by station men on small contracts. The experience gained by this method this year will aid in determining the method to be followed in building the remainder of the road later.

The estimated cost of the entire line is $26,800,000, or $57,000 per mile. In the bill passed by Congress last year, authorizing the construction of this line, it was provided that the

This map used by permission of Rand, McNally & Co.

Proposed Location of the Alaskan Government Railway

total expenditure for the Alaska railways should not exceed $35,000,000. An appropriation of $1,000,000 was made last year for the work of the commission, half of which was expended in making the surveys. An appropriation of $2,000,000 has been made to carry forward the work this year.

W. C. Edes, chairman of the Alaska Engineering Commission, will have immediate charge of this work, with headquarters at Seward, Alaska. Lieutenant Frederic Mears and Thomas Riggs, Jr., the two other members of the commission will continue the surveys.

Recent Developments in Steam Locomotives*

Increases in Power; Improvements in Economy; Advantages of Superheating, Brick Arch and Mechanical Stoking

By George R. Henderson
Consulting Engineer, Baldwin Locomotive Works, Philadelphia, Pa.

The development of the steam locomotive in the last 10 or 15 years has been brought about mainly for two very good reasons: increase in power and increase in economy. These have been subdivided, the first into improvements in tractive effort and horsepower and the second into economies in fuel and labor. The means of obtaining these various factors are best shown by the accompanying table:

Locomotive Development

For increase of				
Power	Tractive effort	Wt. per driving axle, 40,000—70,000 lb.		
		No. of driving axles, 4—12		
		Tractive effort, 40,000—160,000 lb.		
	Horsepower	Size of boiler, 3,000—9,000 sq. ft. H. S.		
		Steam pressure, 180—240 lb. per sq. in.		
		Superheat, 50 deg.—250 deg. F.		
		Horsepower, 1,500—3,000		
Economy	Fuel	Compounding, saving 20%	35%	
		Superheating, saving 25%		
		F. W. heating, saving 10%		
		Arches, etc., saving 5%		
	Labor	Oil fuel	Reduce labor and increase capacity	
		Power reverse		
		Coal pushers		
		Fire door operators		
		Grate shakers		
		Mechanical stokers		

Let us examine, briefly, the changes under these different items.

The weight on driving axles has almost doubled, but the weight of rail has also been increased, say from 70 to 100 lb. per yard, and as each pound per yard is good for a wheel load of 300 lb., when the rail is properly supported, we find that the rail has kept pace with the unit wheel load, which, of course, is a necessary requirement. As in the contests for mastery of guns and armor, so have railroad activities increased track weight and wheel loads, the one necessitating or permitting the other to also advance. But the tractive effort of the locomotive has not been kept down to the comparatively meager increase in weight of rail. Then, too, only the largest roads have been able to afford the expense of such heavy track, and those roads which still use 70 or 80 lb. rail also need greater tractive effort. So it has come about that the number of driving axles to a locomotive has been greatly increased.

With the advancements made in boiler pressure and size, superheating has been prominent as a means of still further increasing output, and a great deal of success has been gained in this direction. The benefit of this operates in two ways, primarily to prevent or reduce cylinder condensation, and after that point has been obtained, the increased volume of superheated steam results in more work being performed with the same quantity of water.

At 50 per cent *real* cut-off, 90 deg. F. superheat will reach the point of saturation about the end of the stroke, when the initial pressure is 200 lb. gage, and with 33 per cent *real* cut-off, about 170 deg. F. superheat are required; any further superheat will give economy by expanding the steam to a greater specific volume than when saturated. In ordinary practice, 100 deg. F. superheat will give about 16 per cent more work or volume than saturated steam and 200 deg. will give about 33 per cent more. The diagram will explain the practical working in locomotives.

Let us consider a locomotive whose tractive effort and velocity relation are typified by curve *A*, the boiler supplying dry saturated steam. If we desire to apply a superheater to this boiler, we must reduce the evaporative heating surface about 25 per cent, so that less saturated steam would be available, considering that the coal consumption or rate of firing is maintained constant per square foot of evaporative heating surface, or 75 per cent as much as in curve *A*. This is shown by curve *B*.

Now apply the superheater elements and with 200 deg. superheat, our tractive effort will rise to curve *C* (same as *A*), but with 25 per cent less coal. Now if we increase the coal consumption to its original amount per square foot of grate surface, which has not been altered, the curve will be shown at *D*, or about 33 per cent more work for the same coal as in curve *A*. The upper curves show the corresponding change in horsepower, for superheating, but this will also depend upon the actual size of the boiler. Ordinarily, in estimating heating surface, it is customary to take the evaporative heating surface plus one and one-half times the superheating surface, and call this the equivalent heating surface of the boiler. As the superheating surface is ordinarily about 22 per cent of the evaporative surface, this places the equivalent surface equal to what the same boiler would have in heating surface, if no superheater had been applied. Roughly, we may determine the horsepower of the boiler by dividing the equivalent heating surface by x, where x equals:

Fuel	Coal	Oil
Non-superheater locomotives	2½	2
Superheater locomotives	2	1½

Thus, by combining the increase in boiler size and superheating benefits, we find an improvement of 3 or 4 times in the available horsepower—a figure that harmonizes with the advancements made in tractive effort.

Among the devices which operate for economy, a part save in fuel and a part in labor only, but the saving in fuel is also a saving in labor, although the latter is not always accompanied by a financial saving. Therefore, only the fuel economies result in a direct benefit in expenses, and the fireman gets the benefit of all—fuel and labor saving devices together.

Compounding was one of the first radical methods of saving fuel, and this appeared in two cylinder compound locomotives. The low pressure cylinder soon assumed such a diameter, however, that it became impractical, and four-cylinder compounds resulted, both as tandem, superimposed and balanced. The saving in fuel was about 20 per cent, but in some cases this was more than offset by the increase in maintenance. With articulated locomotives, however, the practical advantage of low pressure steam in the flexible pipe leading to the low pressure cylinders, is perhaps as great as that of fuel economy.

The Triplex locomotive of the Erie Railroad is a six-cylinder compound, the right high pressure cylinder exhausting to the two front low pressure cylinders, and the left high pressure cylinder sends its used steam to the two rear low pressure cylinders, the ratio of compounding being two. The economy of a compound engine is produced mainly by the reduction of cylinder condensation, owing to the later cut-off used and the smaller temperature variations throughout the stroke.

The economy in superheating is likewise produced by the reduction or elimination of cylinder condensation, in connection with the increased volume of superheated steam, as already explained. This can be accomplished in a simple cylinder as well as in a compound, and if we remove cylinder condensation by means of superheat, we cannot expect to obtain, in addition, the thermal advantages of compounding. In other words, having removed the condensation losses by superheating, there is no condensation left which can be removed by compounding. There are mechanical advantages in articulated and similar locomotives, which are sufficient to justify the combination and the reduction of pressure in the flexible pipes by this means is quite important.

The coal consumption with superheated steam is represented by

*From a paper presented before the New York Railroad Club, April 16, 1915.

the Locomotive Superheater Company to be about as follows:

Deg. F. Superheat	Lb. Coal per hp. hour	Deg. F. Superheat	Lb. Coal per hp. hour
0	3.5	150	3.1
50	3.4	200	2.7
100	3.3	250	2.2

This indicates about 25 per cent saving at 200 deg. superheat, as shown in the diagram.

Feedwater heaters have been used to a limited extent; they have been of various types, from heating the water in the tank to heating just before entering the boiler. If a pump is used to draw the heated water, there may be difficulty on account of the steam generated by the pump suction; this may be overcome by supplying the hot water under a head sufficiently great to prime the pump and allow for frictional resistance in the pipes. Water may be heated from 100 to 140 deg. in this way, at an economy of 10 per cent.

Brick arches and similar arrangements also promote fuel economy, and while 10 per cent has often been claimed, it has been set in the statement at 5 per cent, as so much depends upon the arrangement and maintenance. In bad water districts, where flue trouble is excessive, it may not be practical to keep arches in the fireboxes, as they interfere with access to the flues.

Summing up, then, these various modes of obtaining fuel

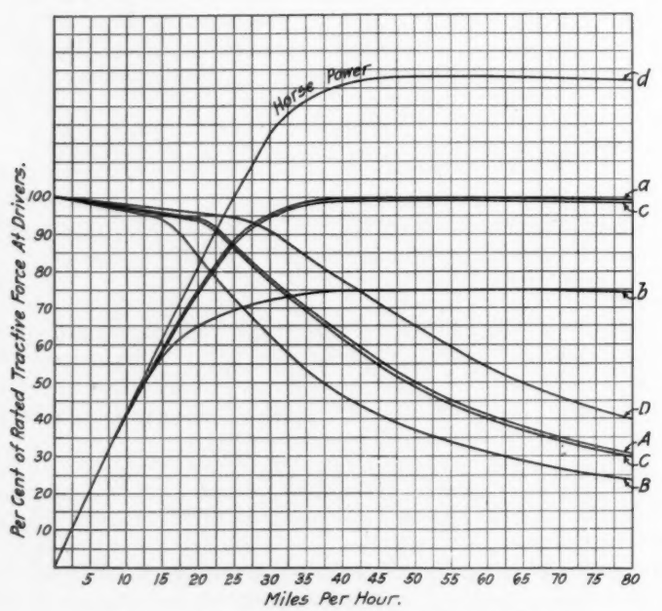


Diagram Showing Advantages of Superheating

economy, we must bear in mind that it will not be possible to realize the sum of the savings shown, but that if we were to combine all of them in a single locomotive we might expect 35 per cent saving over a simple, saturated steam locomotive, without either feedwater heater or brick arch. This is a large economy, however, and well worth the first cost of application and maintenance.

As the items just enumerated reduce the fuel consumption, they will reduce the fireman's labor in the same proportion. There are other means of reducing the manual labor, however, which do not bring a direct return for the money invested, except in so far as they permit a greater output of power, due to the reduction of labor per unit of power generated. Fuel oil is one of the most important of these methods, and while in some localities its price is prohibitive, yet in others it is actually a source of economy, being cheaper than coal. In general, it will permit about 25 per cent greater steam output from the boiler. Where the cost of fuel is too great, a mechanical stoker may be used, and by this means it is possible to put in the firebox twice as much coal as can be supplied by an average fireman.

Coal pushers, fire-door openers, grate shakers, etc., seem rather trifling in themselves, but a trip on a large modern locomotive, where the fireman is supplying coal at the rate of 6,000 lb. an hour, or 100 lb. per minute, will demonstrate the importance of utilizing all these adjuncts in order to get the best work out of the engine. It is a case where a number of small items produce a large result, both in the time saved and in affording greater conveniences to the men.

DISCUSSION

G. M. Basford, chief engineer, railroad department, Jos. T. Ryerson & Son.—During the past ten years improvement in the steam locomotive has been unparalleled in engineering progress. We are so close to this development as to render it impossible to realize its extent and its importance, or to comprehend the possibilities of improvement in railroad operation, which improved economy and the increased capacity due to that economy, renders available. Mr. Henderson says that he has merely scratched the surface of his subject. A very long paper would be required to do more than that. In this generation of human activity the steam locomotive has been brought from a relatively low to a very high position as an efficient, powerful machine. It now takes its place among the great improvements in marine and stationary practice, which the same generation has brought. It is fitting that attention should be directed to this fact. It is important that our electric friends should bear in mind the fact that the steam locomotive of today is on an entirely different basis, as to efficiency, from the steam locomotive of the day when electric locomotives were first introduced. Our electrical friends wll find that they have an entirely different competitor to meet and they will probably discover that the day for general use of electric locomotives is put far into the future by the development covered by this paper.

In 18 years the steam passenger locomotive has increased threefold in tractive effort. In 16 years the freight locomotive has also increased three-fold in tractive effort. The largest figure for indicated horsepower produced on the Pennsylvania Railroad testing plant at the St. Louis Exposition ten years ago was 1,641. This was developed by New York Central, Atlantic type locomotive No. 3000, and was considered a marvelous record at the time. Published records of recent performance of a Pennsylvania Railroad Pacific type locomotive show 3,184 indicated horsepower from the same testing plant at Altoona; possibly this plant has produced a larger figure which has not yet been published. This statement reveals an astonishing increase in power. A record of 3,580 indicated horsepower has been made by a very large freight engine at a speed of 15 miles per hour in road service. A prediction of these figures would have astonished everybody ten years ago.

Increased capacity has been accompanied by improved economy. The best record of the St. Louis tests in 1904 showed 16.6 lb. of steam and 2.01 lb. of coal per indicated horsepower per hour. The latest published figures from the Altoona test plant show 14.6 lb. of steam and 1.8 lb. of dry fuel per indicated horsepower hour. In ten years a reduction of 10 per cent in fuel and 12 per cent in water has been effected, which averages 1 per cent per year for the last ten years. No contemporary development in engineering has produced such an improvement. This is specially interesting from the fact that the best record of the St. Louis tests was made by a European locomotive, which, at the time represented the best engineering practice of the world. It is also of interest to note that this European locomotive was equipped with a superheater and a brick arch. This means that the improved economy mentioned has been obtained by a development with and of these important features.

It is impossible to credit this improvement to any one or to several economy-increasing factors. It is due to co-operative development of a lot of factors, all of which tend to increase economy and, therefore, increase capacity. The most important of these factors may be enumerated as follows:

For the last five years boilers have been designed with reference to the steam required for maximum cylinder horsepower. This method has replaced empirical formulas. Firebox design has greatly improved. Much has been done to increase the effectiveness of draft appliances and exhaust nozzles. Greater at-

tention has been paid to enlarged air openings under the grates. Superheating requires no comment in this connection. Compounding has been worked out in connection with superheating with promise of still further development. Feedwater heating has become a practical success. Fire-brick arches have taken a place of great prominence in locomotive design and in operation, particularly with respect to combustion. The author of the paper specifically mentions 5 per cent as being creditable to the arch; in this connection it is important to observe that the arch contributes to the saving of the superheater and helps to secure the advantages of improved boiler design. The arch renders high superheat possible; these factors help and supplement each other.

Mechanical stokers have become a necessity on locomotives of great power. Stokers certainly contribute to increased capacity in addition to the saving they may make. Improved valve gears help the cylinders in economy and in capacity. Labor saving devices for enginemen and firemen produce an economy and increased capacity in that they enable enginemen to secure the utmost capacity from an engine. We are just beginning to consider the use of high grade alloy steels to reduce weights. They offer means of reducing static weights considerably, but more important is the possibility of reducing the dynamic effect of counterbalance weights by reducing reciprocating weights. Herein is a very fertile field for future endeavor. Yet to come is powdered fuel as the most promising possibility of the future.

We hear much about improved economy of locomotives, but do not hear enough about the possible increase in capacity, which the improved economy permits. An improvement of 25 per cent in economy offers a theoretical increase of 33⅓ per cent in capacity. Assume 6,000 lb. of coal per hour as a figure for coal consumption. If 4 lb. of coal are required per i. h. p. per hour our 6,000 lb. of coal would generate 1,500 i. h. p. If an economy of 25 per cent in fuel is effected, 3 lb. would generate a horsepower for an hour and 6,000 lb. of fuel would develop 2,000 instead of 1,500 i. h. p. This would be an increase of 33⅓ per cent in capacity effected by an economy of 25 per cent in fuel. In other words, if one has $6,000 to spend for items of anything which cost $4 each, he may buy 1,500 items for $6,000. If the price is reduced to $3 each he can buy 2,000 of them, which means an increased buying capacity of 33⅓ per cent for a reduction of 25 per cent in price. This is the ratio of the theoretically possible increase in capacity corresponding with improvements in economy.

I have records showing in actual service an average of 36 per cent saving in coal per ton mile for seven different railroads. This saving effected an average increase of 63 per cent in tons hauled per train. This represents the difference between very large, modern locomotives as compared with smaller ones of earlier design. In another case, seven railroads show an average saving of coal per ton mile of 27 per cent, which led to 34½ per cent increase in load hauled per train, also representing large, modern engines as compared with smaller and older ones. These are figures which actually appear on the treasurer's records. It is one thing to provide economy producing factors, and it is another thing to get these economies into the figures of the treasurer. We must all take our hats off to the men who have effected these great results.

J. P. Neff, vice-president, American Arch Company.—The subject treated in the paper is of vital importance to operating men, as well as to motive power men; in fact it has a greater bearing upon operating than mechanical matters as practically all of the benefits of the recent developments in locomotives tend toward reduction of the cost of conducting transportation, the prime operating account.

I will not attempt to discuss this paper in its entirety, but the author makes a statement that I cannot allow to go unchallenged. In his analysis, we find under the second item, "Economy," first division, "Fuel," that brick arches have been given fourth place and have been credited with a saving of 5 per cent. Elsewhere the author makes the statement that "Fire arches and similar arrangements also promote fuel economy, and while 10 per cent has often been claimed, it has been placed in the statement at 5 per cent as so much depends upon the arrangement and maintenance."

It seems to me that if qualifications are to be made it would be advisable to make the same qualifications for the other three fuel saving devices, that is, the diagram might be constructed to read: "Compounding, saving claimed 20 per cent, realized 10 per cent; superheating, saving claimed 25 per cent, realized 15 per cent; feedwater heating, saving claimed 10 per cent, realized 5 per cent. The summation of the realized percentages would then give the 35 per cent which he shows as the total for all fuel saving devices. This suggestion is made on the same grounds, that "so much depends upon the arrangement and maintenance." Many compounds of fifteen years ago have been simpled because the realized saving was more than offset by certain disadvantages in maintenance and operation. Some of the earlier types of superheaters have not shown a realized saving sufficient to give a net result in their favor, and have given way to more efficient type. Ten or fifteen years ago the arrangement and maintenance of brick arches was not what it is today, and Mr. Henderson's statement regarding these arches would be quite true for conditions fifteen years ago.

I believe that I know where Mr. Henderson secured some of his bad impressions on the brick arch subject, and I think I know something of why he has stated that "in bad water districts where flue troubles are excessive, it may not be practical to keep arches in the fireboxes, as they interfere with access to the flues." About 15 years ago, when Mr. Henderson was assistant superintendent of motive power of the Chicago & North Western, I was division foreman of one of the worst water districts on the system and in a general motive power meeting I made an eloquent appeal for the privilege of removing arches and arch tubes from the locomotives on my division, and received permission to discard them. There were three very good reasons for that action at that time:

First, it was impossible to maintain arch tubes for any length of time, the life being in the neighborhood of three months, due to the scaling up, which we were unable to prevent.

Second, the class of engines on that division had very shallow fireboxes, and the arch tubes were located in the tube sheet only 13 in. from the bottom of the mud-ring, giving about 6 in. clearance between the arch and the grate surface at the front end of the firebox. This was a very bad arrangement and impractical from a firing standpoint.

The third reason was that we had a type of brick arch at that time which, when tube attention was necessary, was entirely destroyed.

Therefore the benefits which we got from a badly arranged arch was not sufficient to give us a net saving, due to the high cost of maintenance of arch tubes and brick. Today, however, in this same bad water district, arches are being run successfully, and are showing a good net result; but they have arches of a practical arrangement from the firing standpoint, they have arch tube cleaners which maintain the tubes free from scale and greatly reduce the cost of arch tube maintenance, and they have a different type of brick which can be removed and reapplied, thereby greatly reducing the cost.

In this same bad water country the Chicago, Milwaukee & St. Paul find that it pays to use arches. Furthermore, the Soo Line, operating in this same bad water country, which is as bad as any in the United States, have, after a year's careful experimenting on several locomotives, decided that it is a paying proposition to run brick arches; but the arrangement is of the latest type and the maintenance is of the high standard prevailing today throughout the country. Many other instances might be mentioned, but the three given should be sufficient, as they represent the worst water conditions in this country. Many roads that would not consider arches ten years ago are now making them standard, even in their worst water districts, simply because the arch tube cleaner has made it possible to run arch

tubes with safety. In the last five years at least 12,000 locomotives have been equipped with arches.

It is not fair to attempt to express the whole virtue of fire arches in percentage of fuel saving, for the reason that the amount of fuel saving depends not so much upon the arrangement and maintenance (which today is of a high standard), but rather on the conditions of operation. When burning a low volatile grade of coal at a low rate of combustion, a low fuel saving must result, but when burning ordinary bituminous coal at a high rate of combustion a high fuel saving does result from fire arches. Just what the average of all conditions over the country would be is impossible to say. We do not make a claim of 10 per cent fuel saving for fire arches, but we do claim, and can very well prove, that a properly designed brick arch in a bituminous coal burning engine makes a 10 per cent better locomotive. A locomotive equipped with an up-to-date arch will easily give 10 per cent more indicated horsepower hours per ton of coal than the same engine not so equipped. When the limit of sustained horsepower depends upon the endurance of the fireman, this limit can even be raised 15 per cent by the use of a properly arranged arch. Many road tests have proved this and indisputable testing plant figures in this country, as well as abroad, verify this figure. I have heard many road foremen state that an engine equipped with an arch is good for one more car in passenger service than the same engine not so equipped, when speaking of the ability of the engine to make a rigid schedule.

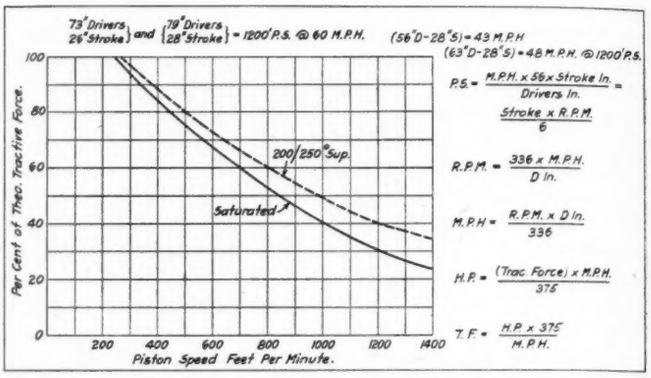
I would therefore suggest that Mr. Henderson revise his diagram putting fire arches where they seem, to me, to belong, in the class of "Capacity Increasers," using the conservative figure of ten per cent.

L. R. Pomeroy, of the United States Light & Heating Co., said that the use of a wide firebox and a more rational arrangement of the parts in modern locomotives had done much to increase capacity and produce economical results. Mr. Pomeroy made use of the accompanying figures and diagram, which is taken from that published in the *Railway Age Gazette*, January 15, 1915, page 96, to show that mechanical stoking is necessary in order to realize the full capacity of large modern locomotives:

Item		4-6-2 P. R. R. class K-4s 1	2-10-2 B. & O. 2	2-10-2 Erie 3
1	Weight on drivers, lb.	200,000	336,800	327,250
2	Tractive force, lb.	41,845	84,500	83,000
3	Diameter of drivers, in.	80	58	63
4	Boiler pressure, lb.	210	200	200
5	Cylinders, diam. and stroke, in.	27x28	30x32	31x32
6	Evap., h. s., sq. ft.	.....	5,573	5,801
7	Superheat., h. s., sq. ft.	.....	1,329	1,377
8	Equiv., h. s., sq. ft.	5,766	.....	.....
9	Grate surface, sq. ft.	70	88	88.1
10	Horsepower by approx. formula (boiler pres.) x 0.017 x (cyl. dia.)	2,600	3,000	3,200
11	Horsepower from diagram	2,700	3,100	3,100
12	Tract. force at 60 m. p. h. (for 4-6-2)	15,700	.....	.....
13	Tract. force at 35 m. p. h. (for 2-10-2)	.....	34,500	34,000
14	Piston speed at 60 m. p. h.	1,180	.....	.....
15	Piston speed at 35 m. p. h.	.....	1,080	1,000
16	Coal per hour at rate of 2.7 lb. coal per hp. hr. given by Mr. Henderson as appropriate for superheat of 200 to 250 deg. F.	(2,600 hp.) 7,020	(3,000 hp.) 8,100	(3,200 hp.) 8,640
17	Coal per hour as checked from given water rate of 21.6 lb. per hp. hour, with varying rates of combustion: (6, 7 and 8 lb. water per lb. coal)			
	4-6-2, 2,600 hp. x 21.6 ÷ 6	9,360		
	2,600 hp. x 21.6 ÷ 7	8,000		
	2,600 hp. x 21.6 ÷ 8	7,000		
	Average	8,120	.....	.....
	B. & O. 2-10-2, 3,000 hp. x 21.6 ÷ 6	10,800		
	3,000 hp. x 21.6 ÷ 7	9,255		
	3,000 hp. x 21.6 ÷ 8	8,100		
	Average	.....	9,385	.....
	Erie 2-10-2, 3,200 hp. x 21.6 ÷ 6	11,500		
	3,200 hp. x 21.6 ÷ 7	9,850		
	3,200 hp. x 21.6 ÷ 8	8,650		
	Average	.....	.....	10,000
18	Coal per sq. ft. of grate per hr. (Item 16 ÷ Stem 9.)	100	92	97.5
19	Reduction in tractive force due to 5,000 lb. per hour	29%	38%	48%

The Master Mechanics' Association Locomotive Dictionary shows a No. 3 scoop as representative. The manufacturers rate such a shovel for ordinary bituminous coal, as 19½ lb. per shovel; at 5,000 lb. of coal per hour such a shovel would mean 256 scoops per hour, 4.26 per minute, or 1 shovelful every 14 seconds. These figures show quite conclusively that 5,000 lb. per hour is a fair assumption for comparison as a "fireman rating."

On this assumption (5,000 lb. per hour as the working limit


73" Drivers 26" Stroke and 79" Drivers 28" Stroke = 1200 P.S. @ 60 M.P.H.
(56"D-28"S) = 43 M.P.H
(63"D-28"S) = 48 M.P.H. @ 1200 P.S.
Per Cent of Theo. Tractive Force.
100
80
60
40
20
0
200/250° Sup.
Saturated
200
400
600
800
1000
1200
1400
Piston Speed Feet Per Minute.
P.S. = M.P.H. x 56 x Stroke In. / Drivers In. = Stroke x R.P.M. / 6
R.P.M. = 336 x M.P.H. / D In.
M.P.H = R.P.M. x D In. / 336
H.P. = (Trac. Force) x M.P.H. / 375
T.F. = H.P. x 375 / M.P.H.

Relation of Speed Factor in Saturated and Superheated Steam Locomotives, with Some Convenient Formulas

for average firing) the practical realization of these designs of locomotives is somewhat short of the design expectancy, viz.:

P. R. R. 4-6-2..... $1 - \frac{5000 \times 100}{7020}$ = 29 per cent less

B. & O. 2-10-2..... $1 - \frac{5000 \times 100}{8100}$ = 38 per cent less

Erie 2-10-2..... $1 - \frac{5000 \times 100}{8640}$ = 48 per cent less

The logic of the comparison is obvious. To realize the possibilities of design the fireman must be supplemented by some form of stoker, or oil fuel used.

B. P. Flory, superintendent of motive power, New York, Ontario & Western, referred to the advantages produced in the modern locomotive by the use of outside valve gears.

C. E. Chambers, superintendent of motive power, Central Railroad of New Jersey, stated that while superheaters undoubtedly increase capacity and economy there is an undoubted increase in maintenace costs, a point which should not be lost sight of.

Mr. Henderson illustrated his talk with a number of lantern slides, which included a proposed locomotive of the 2-8-8-8-8-2 type with the cab at the front end. In closing he referred to the 107 locomotives which the Baldwin Locomotive Works have recently built for the French government. These engines weigh about 14 tons each, have a firebox in the middle and a smoke stack at either end, and are for use on rough track in moving guns, etc.

LET THE INTERSTATE COMMERCE COMMISSION RULE*

BY T. C. POWELL
Vice-President, Cincinnati, New Orleans & Texas Pacific

The makers of the constitution could not in the nature of things anticipate the immense development of our internal transportation system. In those days transportation by water was the most important method and the limited movement on land was incidental to the water transportation, and in so far as the constitutional convention and Supreme Court were able to base their opinions upon known conditions, they provided the proper government of common carriers by water and the individual states have never had much to say about the regulations on the navigable rivers and waters of the United States.

The legislators and jurists of the eighteenth century did not have an opportunity of passing upon the regulation of

*From an address at the annual dinner of the Friendly Sons of St. Patrick on March 17, 1915.

steam and electric railroad facilities, and even when the first state railroad commissions were created, there was so little precedent to guide them that each state commission wanted to extend authority over each railroad which entered or passed through that particular state, and wanted to regulate each of these railroads as far as they extended, even into other states.

Fortunately, most of the railroad systems were short and there were only two or three commissions and the conflict of authority did not assume any great importance. Now, we have a commission in nearly every state. During the last two years there were introduced into the state legislatures over 1,700 bills regulating railroads. These diverse opinions, sectional jealousies, also the lack of information and honest variations in judgment have wrought "confusion worse confounded."

One state law requires screens for car windows and the adjoining state declares screens to be an offense against the law. One state demands that the railroads handling freight within its borders shall give preferential rates on native-grown commodities, while another state traversed by the same railroad insists that its citizens shall enjoy the lowest rates in existence, "and poured 'round all" is the national authority of the Interstate Commerce Commission.

No business man believes that this condition favors the development of commerce. It would be much better for the railroads and the stockholders thereof, who are numbered by the thousands, and the public who are not stockholders, and particularly for the business men, if by constitutional amendment the several states would agree to give up this destructive individual authority and place the responsibility for the proper regulation of all common carriers by land and water on all classes of traffic, within and without the borders of each of the several states, in the hands of and under the jurisdiction of a national commission.

If this country is to resume its commercial standing and to go forward to greater prosperity, such an amendment to the constitution must be approved by the several states. I hope such action will come soon, because, as it appears to me, this is the only thing that will forestall governmental ownership and operation of our railroads.

HEARING ON WESTERN FREIGHT RATE ADVANCES

The western freight rate advance hearing at Chicago before Commissioner Daniels during the past week has been devoted to testimony of shippers and their representatives and rate experts of western state railroad commissions protesting against the proposed advances in the rates on specific commodities. Testimony on the advances on cotton piece goods was given on April 12 and 13, and on coal and coke on April 14, 15 and 16. This was followed by testimony on grain and grain products from April 17 to 21, and on fruits and vegetables on April 22 and 23.

That the increase in rates on cotton piece goods would operate to place manufacturers of overalls at St. Joseph, Mo., at a further disadvantage in selling in competition with prison-made garments was testified by H. G. Krake, manager of the traffic bureau of the Commercial Club of St. Joseph; J. D. Richardson, president of the Richardson Dry Goods Company; R. W. Powell, vice-president of the Britton Dry Goods Company; T. C. Holland, secretary and treasurer of the Wheeler & Motter Mercantile Company, and R. L. Campbell, vice-president of the Tootle-Campbell Dry Goods Company. Mr. Krake said that at present the rate on cotton piece goods from the Mississippi river to St. Joseph is 32 cents. The short line mileage from Quincy, Ill., is 204 miles; from Jefferson City, Mo., 125 miles; from St. Louis and Sedalia, 204 miles; from St. Louis the rate is only 17½ cents, and the railroads are asking to advance the rate to St. Joseph to 37 cents without any change in the rate to Jefferson City and Sedalia, he said. Mr. Richardson said his company sells goods in competition with the prison-made garments of Jefferson City, and that the disadvantage would be increased by the difference in rates. Other testimony on cotton piece goods was given by C. C. Wilbur, traffic manager of M. E. Smith & Co., Omaha, and D. E. Nettels, traffic manager of the Postex Cotton Mills of Post City, Tex. S. H. Johnson, assistant freight traffic manager of the Chicago, Rock Island & Pacific, was called to give some brief testimony in rebuttal.

General testimony on coal rates was given by representatives of the Illinois Coal Operators' Association, followed by representatives of the Iowa shippers. F. H. Harwood, vice-president of the New Kentucky Coal Company of Chicago, testified in opposition to the proposed advance of 10 cents per ton on coal from the Indiana and Illinois mines to points in Iowa, Missouri and Minnesota. He said the advance would result in greater tonnage moving via Duluth and the Great Lakes from eastern coal fields. Charles N. Moderwell, also representing the Illinois Coal Operators' Association, said that the advance would curtail the market for Illinois coal in the Northwest. The Illinois and Indiana coal industry is in such condition that it cannot stand an advance unless it is uniform, he said. W. B. Martin, commissioner of the Dubuque Shippers' Association, said that the proposed advances on eastern and Illinois and Indiana coal to the west bank of the Mississippi river involve the same amount of advance that was under consideration by the Interstate Commerce Commission in the eastern five per cent rate case. At that time, he said, the roads sought to advance the rates to Chicago, and in addition to advance the rates from Chicago to the river by five cents per ton. Both increases were denied, but the carriers are now seeking to increase the rates from Chicago 10 cents per ton.

Representatives of a number of Chicago packers having plants on the Missouri river opposed the application of southwestern railroads for an increase in the rate on slack coal from the Pittsburg, Kan., mining district to Omaha, South Omaha, St. Joseph and Sioux City. W. W. Manker, assistant traffic manager of Armour & Co., and R. O'Hara, rate expert for Swift & Co., presented figures to show that existing rates from these fields were on a higher basis than from competitive fields for similar distances. Mr. Manker said that the proposed rates from Missouri and Kansas to Missouri river points where Armour & Co. have packing plants would mean an advance of from $10,000 to $12,000 a year to Armour & Co. The total freight charges paid on fuel by this company, he said, amount to $278,000 per year. J. O'Halleran, representing a sugar refinery at Clinton, Iowa, protested against the advance from Franklin county, Illinois, which he said was unreasonable. He thought the earnings per car under the present rates were sufficiently remunerative. F. J. Danner, traffic manager of the Davenport, Iowa, Commecial Club, testified against the proposed advances in coal rates on behalf of the members of his association, and presented a table showing the tonnage of coal consumed by the various industries. The largest consumer of coal on this list was the Bettendorf Company of Bettendorf, Iowa. A. P. Humburg, commerce attorney of the Illinois Central, asked the witness if he had heard of a letter written by President Bettendorf of this company to Clifford Thorne, vigorously advocating the granting of the advances in rates. The witness said he had heard of the letter and that he had no authority to represent the Bettendorf Company in this proceeding.

C. E. Childs, commissioner of the traffic bureau of the Sioux City, Iowa, Commercial Club, presented figures to show that coal pays more per car than certain other commodities, including livestock and packinghouse products. He said he thought the roads would have a much better argument to advance those rates. D. L. Kelley, rate expert of the South Dakota Railroad Commission, testified that the proposed advance in rates on bituminous coal would seriously retard the industrial development of South Dakota, which, he said, is now held in check by the in-

ability to secure an ample fuel supply upon a reasonable transportation basis.

Mr. Kelley submitted several exhibits covering rates on coal from the docks and mines to representative points in South Dakota, with the earnings, volume of tonnage and comparisons with rates in other sections of the country to show, he said, that the haul to South Dakota consuming points is from two to three times the average haul on bituminous coal for the entire country, but that notwithstanding that situation the rates per ton mile are higher. He said the proposed advances would cost coal consumers of South Dakota alone over $91,000 a year.

John E. Sargent of Kansas City, representing a large number of coal mines in the Southwest, testified that the coal interests are not opposed to the requests of the railways for increased rates, but are interested in the competitive relationships. "I have nothing to say as to whether the railways should or should not get the increase they ask for," he said, "except that possibly the railways need more revenue as much as we. What we do say is that there should be an absolutely uniform advance." Mr. Sargent then described the difficulties arising because of the conflict of state regulation with interstate rates, especially with reference to the situation at Kansas City, where the state line separates two large consuming points which are adjacent. He said it would mean ruin to the Missouri coal mines if the interstate rates are raised and the state rates are not advanced. E. R. Trotter of Kansas City, testified as to the displacing of coal by fuel oil, and said that the proposed advance on coal would place it at a further disadvantage as compared with oil. J. C. Storm of Amarillo, Tex., took the stand as an individual protestant to describe what he termed an unfair situation as to the rates in general applying to Amarillo. He compared rates on numerous commodities to a number of cities, showing other cities had lower rates. "All coal rates are too low," he said, "but when you put them up you ought to take it off of something else. If coal is shipped at these low rates somebody else must pay the fiddler."

The grain interests began their opposition to the advances on grain on April 17. A. E. Helm, commerce counsel of the Kansas Public Utilities Commission, made an opening statement defending the action of the western state railroad commissions in protesting against the proposed increases and declaring that the railroads were seeking to levy an additional toll upon one of the most profitable products they handle. Judge Helm said that in reply to the testimony offered by the carriers it was proposed to show that the relative proportion of the products of agriculture handled by the western railways is much greater than that handled by the eastern roads, and that the present rates on these commodities are higher than the average of rates on all tonnage, while the operating ratio is lower than upon almost any other class of carload freight moving in substantial quantities. He also said it was proposed to show that the exhibits offered by the carriers contained many substantial errors and do not reflect representative conditions; that the exhibits to be filed by the protestants will show that both the present and the proposed rates on grain and grain products are very much higher than the rates upon these commodities for similar distances in Central Freight Association territory, and that the percentage of excess of these rates over the grain rates for similar distances in the East is greater than the percentage of excess of class rates in the West over the class rates in Ceneral Freight Association territory. "We shall show," he said, "that the products here involved now sustain more than their full share of the burdens of transportation, and that any addition to these charges will be unreasonable and unjust to the farmers of the West who pay the freight on these commodities."

W. M. Hopkins, formerly manager of the transportation department of the Chicago Board of Trade, testified that the grain rates should not be advanced because a saving equal to the proposed increase might be effected if a more economical method of handling grain were practiced by the carriers, and that grain already pays more than its share of the total transportation charges. Mr. Hopkins said that grain is a very profitable commodity for the carriers, because the great grain fields are located in the Central West, thus giving the carriers a long haul and a large revenue on grain seeking eastern or southern territory of consumption. He also presented figures in reply to statements made by E. B. Boyd, chairman of the Western Trunk Line Committee, while on the witness stand for the carriers, that the proposed rates on grain were lower than the rates in the Northwest or in the territory east of Chicago.

To illustrate what he called the uneconomical methods of handling grain, Mr. Hopkins mentioned the unsatisfactory character of many of the cars furnished for grain loading, failure to furnish receipts, unnecessary delays in road haul movements, delays at terminals and unnecessary switching. The claims for loss and damage, he said, should not be given consideration as justification for imposing higher transportation charges, because the losses that arise are due to negligence of the carriers.

"The carriers claim that grain is not paying its share of the transportation costs," he said. "In 1914, the average freight revenues of the North Western, Burlington, Great Western, St. Paul, Rock Island, Illinois Central and Minneapolis & St. Louis were $57,072,122. Had all the traffic paid wheat rates, the revenue would have been $90,127,414; had it paid corn rates, $76,254,889. Against an average revenue per ton of freight of $1.65616, wheat shows, $2.60 and corn $2.20. The average ton mile revenue was 7.7 mills; wheat paid 11.87 and corn, 10.05 mills. The average revenue on freight per train mile was $2.92159; wheat paid $10.01503 and corn $7.53931. The average revenue per car mile on all traffic was 13.906 cents, against 47.33 on wheat and on corn 35.63. The average revenue per loaded car, all traffic, was $29.7619; the average revenue per loaded car on wheat was $103.7566, and on corn, $78.0329."

"Isn't most of the corn moved in the winter months, when transportation costs are high?" asked T. J. Norton, general attorney of the Atchison, Topeka & Santa Fe.

"I think that is true," replied Mr. Hopkins.

Mr. Norton also brought out that under transit arrangements, although the grain may come into a milling point in heavy carloads, yet the flour which moves out on the balance of the same rate makes a very light carload. The witness admitted that although the farmer pays the freight to the point of purchase, a great quantity of grain is sold before its destination is known and the freight from elevator to destination then is not paid by the producer. It was also shown that the witness, in his comparison of grain rates in western and eastern territory, had compared local rates with proportions of through rates in a manner which has been declared improper by the Interstate Commerce Commission.

E. H. Hoagland, of Topeka, Kan., introduced figures covering the amount of grain originating in the states affected to show the tonnage of grain traffic.

"How much of the Kansas corn crop is moved out of the state?" asked Mr. Norton.

"About one-sixth, probably," replied Mr. Hoagland.

"Yet you have used the entire crop figures to determine the density of corn tonnage per mile of line," pointed out Mr. Norton. "You have made no calculation which considers the small load of flour as against the large load of wheat, both of which move on the same through rate?"

The witness stated he had not taken this into consideration. Other witnesses who opposed the advance in grain rates included G. R. Hall, of the Duluth Board of Trade, and J. H. Schaefer, of the Iowa State Retail Merchants' Association.

RAILWAY EXTENSION IN NORTHERN MANCHURIA.—The survey and investigation of the proposed railway line from Chinchow in Shengking Province to Taonanfu in Mongolia are reported to have been completed. It is said that the Chinese engineer who had charge of the survey will probably be appointed chief engineer for the construction of the line.

General News Department

The Interstate Commerce Commission has begun valuation work on the Puget Sound line of the Chicago, Milwaukee & St. Paul.

The bill to repeal the full crew law of New York, which has been before the legislature of that state for several weeks was passed by the Senate on April 20 by a vote of 30 to 18.

The bill to repeal the full crew law, which has been before the legislature of Pennsylvania for several weeks was passed by the lower House on April 19 by a vote of 135 to 68, substantially a two-thirds majority. Representative Palmer, of Schuylkill, in a speech opposing the bill said that if the law were repealed the employees would retaliate on the railroads and secure legislation ten times more drastic than the full crew law. The bill gives specific authority to the Public Service Commission to decide as to the proper number of men to be employed in manning railroad trains.

The Wisconsin assembly has passed a bill prohibiting the giving or offering of any gratuity by patrons of any hotel, restaurant, barber shop or public service corporation engaged in the transportation of passengers. The penalty is a fine of from $5 to $25. The lower house of the Minnesota legislature has passed a similar bill.

The Pacific Mail Steamship Company announces that it has cancelled all sailings of its vessels after November 2, 1915, November 4 being the day on which the new seamen's law goes into effect, imposing restrictions which will make the operation of the company's vessels unprofitable. This company operates 19 vessels, 5 of them in the trans-Pacific trade. The vessels running to Asiatic ports have Chinese crews. No freight contracts will be made beyond July 31.

The Lehigh Valley reports that 289 regular freight trains run during the month of March made a record of being on time 98.4 per cent. Eight daily through freight trains leaving either Jersey City or Buffalo, arrived at their terminals every day on time. The New York State Public Service Commission, Second district, has advised the management that a recent ten-day check of l. c. l. freight between Buffalo and Geneva gave the Lehigh Valley 100 per cent for delivery on scheduled time.

Chairman Walsh of the federal Commission on Industrial Relations has excused Robert T. Lincoln, chairman of the board of directors of the Pullman Company, from going to Chicago to testify in its investigation of the wages and conditions of employment of Pullman conductors and porters. Mr. Lincoln had sent a letter stating that he would be unable to appear at the Chicago hearing on account of his health. At first Chairman Walsh said that a writ of attachment would be issued for Mr. Lincoln, but later he announced that the commission would hear Mr. Lincoln's testimony when it holds its next public hearing at Washington on May 6.

A Texas correspondent writes: "Governor James E. Ferguson plans to gain a first hand knowledge of the condition of the railroads of Texas and their traffic possibilities. He has just finished a tour of the Texas line of the Kansas City, Mexico & Orient, accompanied by a party of officers of that road. The governor was impressed very favorably with the wonderful strides of agricultural development. In his younger days Governor Ferguson was a bridge builder on the Santa Fe, and he is favorably disposed towards railroad investments in Texas. His attitude towards this class of corporations is something of a novelty in a governor of this state."

In the United States District Court at New York on Wednesday the government made a motion for the modification of the recent order, granting bills of particulars to William Rockefeller and eleven other directors, past and present, of the New York, New Haven & Hartford concerning the indictment found against them for violating the Sherman anti-trust law. Assistant Attorney General Swacker asked the court to disallow the request of the directors for particulars on 22 points, and to modify it on others. The order of Judge Hunt required the government to furnish the directors with information as to the acts which it intended to prove, that the defendants had done or were in the act of doing in the three years immediately before February 26, 1915, the date of the indictment, in furtherance of the alleged conspiracy.

One of the small economies practiced by a number of railroads recently has been to print on the face of envelopes used for railroad mail 12 different spaces for the addresses, so that the envelopes may be used 12 times by using a new space each time for the address and crossing out the names previously used. Heavy Manila paper envelopes are used, of such quality that they do not wear out for some time. An officer of the Baltimore & Ohio has sent us an envelope of this kind which is estimated to have traveled 10,000 miles, and has contained 12 communications between various offices on the Baltimore & Ohio system. The envelope is somewhat soiled but is otherwise in good condition. The Rock Island lines have been using this plan for some time where large envelopes are required. Each envelope bears the instructions, printed in large type: "Do not seal unless absolutely necessary. Use one square for address in each case. When empty return to stationery department, Chicago, for further use. (Do not roll.)"

Accident Record—Correction

An officer of the Pennsylvania advises that the details in the account of a derailment on that road at Morris Junction, Pa., February 25, reported in the *Railway Age Gazette*, April 2, page 746, were not correctly given. The train was a freight, not a passenger, and the damage was slight; and no persons were injured.

Continuous Home Route Card

The continuous home route card, to go with a freight car when away from home until it is returned to the owning road, which has been recommended for general use by the committee of the American Railway Association, and which is described on page 884 of this paper, will, on May 1, be put in use, in their exchanges with each other, by the following roads: Bessemer & Lake Erie; Buffalo, Rochester & Pittsburgh; Baltimore & Ohio; Buffalo & Susquehanna; Cleveland, Cincinnati, Chicago & St. Louis; Chicago, Rock Island & Pacific; Chicago & Eastern Illinois; Chicago, Indianapolis & Louisville; Central of New Jersey; Central New England; Chesapeake & Ohio; Cincinnati, Hamilton & Dayton; Delaware & Hudson; Delaware, Lackawanna & Western; Erie; Grand Trunk; Grand Rapids & Indiana; Hocking Valley; Illinois Central; Indiana Harbor Belt; Lehigh & Hudson River; Lehigh & New England; Long Island; Lehigh Valley; Lake Erie & Western; Michigan Central; New York, New Haven & Hartford; New York Central; New York, Chicago & St. Louis; Pennsylvania; Pennsylvania Lines West of Pittsburgh; Pittsburgh & Lake Erie; Pittsburgh, Shawmut & Northern; Philadelphia & Reading; Toledo & Ohio Central; Wheeling & Lake Erie; Western Maryland.

International Engineering Congress

Volume IV of the transactions of the International Engineering Congress, which will be held at San Francisco in September, will comprise an important series of papers on the general subject of "Railways and Railway Engineering." This field will be treated under seven principal topics covering the relation of railways to social development; the present status of railways; the economic factors governing building of new lines, location; the physical characteristics of road including track and roadbed; bridges; tunnels; terminals; construction methods; signals; road equipment, including motive power other than electric; rolling stock in general; floating equipment; electric motive power in general.

Approximately 27 papers are expected for this volume, pre-

pared by authors representing 9 different countries. The list of authors includes many of the most eminent names in this field of engineering work throughout the world.

The volume will be well illustrated with charts, diagrams and half-tones, and will contain discussions contributed by leading American and foreign engineers.

The transactions of the congress as a whole will include nine or ten other volumes, covering the various fields of engineering work.

Operating Revenues and Expenses of Express Companies

The following statement, which is subject to revision, has been compiled by the Interstate Commerce Commission from the monthly reports of operating revenues and expenses of the principal express companies for December, 1914. (The express companies have three months in which to make reports to the commission.)

A.—For the Month of December

Item	Adams Express Co.		American Express Co.		Canadian Express Co.		Globe Express Co.		Great Northern Express Co.	
	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913
Mileage of all lines covered (miles).	44,923.41	38,625.94	72,262.78	59,780.98	9,676.50	7,080.30	2,839.78	2,839.78	9,607.73	9,323.51
Charges for transportation	$3,167,103	$3,409,080	$4,108,479	$3,954,986	$271,132	$295,023	$57,562	$54,642	$269,671	$298,080
Express privileges—Dr.	1,583,494	1,931,400	2,143,986	1,950,331	143,699	141,870	28,970	27,953	163,577	181,221
Operations other than transportation.	41,097	35,149	154,188	185,617	5,211	9,094	887	873	4,060	4,535
Total operating revenues	1,624,707	1,512,829	2,118,681	2,190,271	132,645	162,247	29,479	27,562	110,155	121,394
Operating expenses	1,650,293	1,572,605	2,124,016	2,058,338	137,385	159,107	28,413	30,282	84,456	92,485
Net operating revenue	—25,585	—59,775	—5,335	131,933	—4,740	3,140	1,065	—2,719	25,698	28,909
Uncollectible revenue from transp'n.	363	.....	239	.....	.....	.....	.....	.....	5	.....
Express taxes	17,113	17,291	35,320	31,067	4,000	2,850	1,100	1,200	3,813	3,737
Operating income	—43,062	—77,067	—40,896	100,865	—8,740	290	—34	—3,919	21,880	25,172

Item	Northern Express Co.		Southern Express Co.		Wells Fargo & Co.		Western Express Co.		Total for all companies named*	
	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913
Mileage of all lines covered (miles).	8,118.34	8,080.40	34,552.60	33,623.60	112,534.06	99,744.95	5,174.26	5,008.97	299,689.46	296,816.54
Charges for transportation	$225,387	$249,706	$1,544,698	$1,913,020	$3,590,352	$3,054,584	$105,442	$115,428	$13,339,831	$15,272,185
Express privileges—Dr.	123,264	136,385	783,872	967,378	1,812,423	1,523,830	56,736	65,612	6,840,025	7,884,719
Operations other than transportation.	3,335	3,577	28,655	35,537	61,974	58,978	3,580	2,823	302,992	364,042
Total operating revenues	105,458	116,898	789,481	981,179	1,839,904	1,589,731	52,286	52,639	6,802,798	7,751,508
Operating expenses	90,742	93,381	594,178	706,226	1,588,482	1,289,486	55,278	52,133	6,353,248	6,978,556
Net operating revenue	14,716	23,517	195,302	274,952	251,422	300,245	—2,992	505	449,550	772,952
Uncollectible revenue from transp'n.	11	4	60	54	2,888	.....	1	.....	3,571	59
Express taxes	5,000	4,500	14,582	17,933	35,082	33,000	527	705	116,540	125,037
Operating income	9,704	19,012	180,659	256,965	213,450	267,245	—3,522	—199	329,439	647,856

B—For the Six Months Ending with December

Item	Adams Express Co.		American Express Co.		Canadian Express Co.		Globe Express Co.		Great Northern Express Co.	
	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913
Charges for transportation	$17,733,604	$18,272,377	$23,977,785	$22,569,404	$1,710,161	$1,789,822	$398,879	$393,688	$1,732,318	$1,845,859
Express privileges—Dr.	9,130,232	9,666,577	12,038,405	11,205,964	870,054	847,369	199,926	197,522	1,051,255	1,121,139
Operations other than transportation.	258,702	196,266	1,079,112	1,137,706	31,428	57,880	5,113	5,417	28,341	27,503
Total operating revenues	8,862,074	8,802,067	13,018,491	12,501,146	871,535	1,000,333	204,066	201,583	709,403	752,223
Operating expenses	9,395,500	8,707,936	12,869,482	11,951,819	812,634	893,099	178,854	187,445	540,178	554,716
Net operating revenue	—533,425	94,131	149,008	549,326	58,901	107,233	25,211	14,137	169,225	197,506
Uncollectible revenue from transp'n.	2,739	.....	943	67	.....	.....	.....	.....	5	.....
Express taxes	102,244	98,610	213,111	181,085	24,000	17,000	6,600	7,200	24,617	24,833
Operating income	—638,409	—4,479	—65,045	368,178	34,901	90,233	18,611	6,937	144,603	172,673

Item	Northern Express Co.		Southern Express Co.		Wells Fargo & Co.		Western Express Co.		Total for all companies named*	
	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913
Charges for transportation	$1,521,862	$1,716,413	$6,981,852	$8,054,720	$19,580,863	$16,894,594	$616,284	$669,078	$74,253,612	$83,005,623
Express privileges—Dr.	822,436	925,436	3,556,020	4,095,462	10,005,423	8,428,923	331,162	374,479	38,004,917	42,263,633
Operations other than transportation.	21,036	21,278	158,406	173,719	373,410	344,204	19,068	15,152	1,974,620	2,139,296
Total operating revenues	720,463	812,255	3,584,237	4,132,977	9,948,851	8,809,875	304,191	309,751	38,223,315	42,881,286
Operating expenses	554,493	573,667	3,210,416	3,528,640	9,208,641	7,666,393	325,216	309,397	37,095,418	39,803,366
Net operating revenue	165,969	238,588	373,821	604,336	740,209	1,143,481	—21,025	354	1,127,897	3,077,920
Uncollectible revenue from transp'n.	74	19	230	84	5,309	.....	52	.....	9,355	171
Express taxes	30,000	27,000	88,254	90,232	221,141	195,000	6,184	4,628	716,153	707,885
Operating income	135,894	211,568	285,336	513,969	513,759	948,481	—27,261	—4,274	402,389	2,369,864

*Includes previous year's returns of United States Express Co.

Meeting at Franklin Institute

A paper on Locomotive Stokers was presented at the Franklin Institute, Philadelphia, on Wednesday evening, April 21, by W. S. Bartholomew, president of the Locomotive Stoker Company, Schenectady, N. Y. Lantern slides were employed showing in detail the construction of the various types of stokers now in service and a brief history of the development of mechanical stoking as applied to locomotives was given. There are now in successful service over 600 Street stokers, about 400 Crawford underfeed stokers and about 20 each, of the Standard and the Hanna types. Mr. Bartholomew gave some figures showing the increase in tonnage effected by the use of mechanical stokers on large locomotives. The paper was discussed by representatives from the Baldwin Locomotive Works, the Chicago, Burlington & Quincy and the Baltimore & Ohio.

Association of Passenger Traffic Officers

At the annual meeting of the American Association of Passenger Traffic Officers held in San Francisco on April 15 and 16, Alexander Hilton, passenger traffic manager of the St. Louis & San Francisco was elected president and C. M. Burt, general passenger agent of the Boston & Maine, vice-president. W. C. Hope, general passenger agent of the Central of New Jersey, was re-elected secretary.

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 18-21, 1915, Richmond, Va.

American Railway Association.—W. F. Allen, 75 Church St., New York. Next session, May 19, 1915, New York.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 22-26, 1915, Hotel Traymore, Atlantic City, N. J.

American Society of Civil Engineers.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Next spring meeting, June 22-25, 1915, Buffalo, N. Y. Annual meeting, December 7-10, 1915, New York.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Piedmont Hotel, Atlanta, Ga.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, May 19, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting with Master Car Builders' and Master Mechanics' Associations. Annual meeting, October, 1915.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conrad, 75 Church St., New York. Next meeting, June 22-23, Niagara Falls, N. Y.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday in month, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Hotel La Salle, Chicago.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 25 to 28, 1915, Chicago, Ill.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

Peoria Association of Railroad Officers.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

Railroad Men's Improvement Society.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May, Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Signal Association.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Stated meeting, May 26-27, 1915, Hotel Astor, New York. Annual meeting, September 14-17, 1915, Salt Lake City, Utah.

Railway Storekeepers' Association.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio. Annual meeting, May 17-19, 1915, Hotel Sherman, Chicago.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders' and Master Mechanics' Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of Newark.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Hotel Astor, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Gen. Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Dispatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Utah Society of Engineers.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

Western Canada Railway Club.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

Traffic News

The National Industrial Traffic League has announced that its postponed spring meeting will be held at the Hotel Chisca at Memphis, Tenn., on May 13 and 14.

At the Western freight rate hearing in Chicago, on Wednesday of this week, Commissioner Daniels announced that the commission would not submit to the carriers the 38 questions propounded by Clifford Thorne, but would submit a list of its own, which would include a part of the subjects embraced in Mr. Thorne's list.

Trains 31 and 32 of the Southern Railway, formerly running through between Washington, D. C., and Jacksonville, Fla., now run only between Charlotte, N. C., and Savannah, Ga. The Jacksonville sleeping car will be run between Savannah and Jacksonville on Atlantic Coast Line trains 83 and 82. Trains of the Southern Railway south of Savannah run over the tracks of the Atlantic Coast Line, and the announcement of the discontinuance of trains 31 and 32 appears to have led to a report that the trackage contract had been terminated; but this is not the fact, as other trains of the Southern still use the A. C. L. tracks in this territory.

W. B. Biddle, receiver and chief traffic officer of the St. Louis & San Francisco, announced last week that freight tariffs approximately 30 per cent higher than the present Arkansas commission tariffs will be put into effect in Arkansas within the next 10 days, as the result of the decision by the United States district court at Little Rock, granting a perpetual injunction against the enforcement of the commission freight tariffs and the state two-cent fare law. Mr. Biddle said that the rate applied is based upon the Minnesota scale and that the rates proposed with the increased passenger rates, will yield a return estimated at 3.6 per cent on the company's investment in Arkansas.

The Baltimore & Ohio Railroad, according to a new slogan, is the "Best & Oldest Railroad," and on the Cleveland division, this phrase has been adopted and used in official communications and bulletins. J. W. McCombs, agent at Uhrichsville, Ohio, uses it in soliciting the routing of orders of traveling salesmen. . . . "One of our plans," says Mr. McCombs, "is to talk to salesmen, inquiring whether they did any business in our city and asking them whether the routing had been specified. Usually we find that there has been no preference expressed and the salesmen are asked to favor this company, while we acquaint them with our service. Nine out of ten salesmen will go through their order books and favor us with their business. I carry a pad of routing orders with me and have found that the plan has secured a large amount of revenue for this station."

E. Pennington, president of the Minneapolis, St. Paul & Sault Ste. Marie, has issued a pamphlet entitled "Why Railroad Passenger Fares Should be Raised and Why a Raise Will Help Your Pocketbook, A Frank Talk to the People and Their Lawmakers," which discusses in a popular way the reasons why the railroads need greater revenues and why passenger fares should be advanced. The pamphlet is divided into seven chapters, as follows: When and by Whom Built; Value and Capitalization; Who Owns the Railroads?; Services Performed and Pay Received; What the Money Goes for and Who Gets It; Passenger Service Underpaid; What More Pay Means. Under the head of "Wages," the names are given of a large number of conductors, engineers, firemen, brakemen and switchmen employed on the Minneapolis, St. Paul & Sault Ste. Marie, the Chicago, Milwaukee & St. Paul and the Chicago, St. Paul, Minneapolis & Omaha during the year 1914, with figures showing, for each man, the amount of wages actually received.

The arguments, as presented at Chicago, for and against the "trap-car" tariffs which were filed by the principal railroads and suspended by the commission, were reported in the *Railway Age Gazette*, April 2 and 9. The subject was again taken up at a hearing before the commission at Washington on Monday of this week. Statements on behalf of the railroad companies were made by George S. Patterson and William D. McHugh. John D. Burchmore appeared for the Industrial Traffic League.

Those opposing the imposition of a charge for trap-car service declared that the tariffs as filed were a hodge-podge of discriminations, excessive charges and unworkable provisions. The proposed minimum of $2 a car in Trunk Line territory, and $4 in Central Freight Association territory, by the difference between them, cause many discriminations. In cities where large numbers of automobiles are made, the shippers save the railroads large sums by loading automobiles at the factories, their men being more skillful than the railroad workmen; and now, they say, it is proposed that the shipper shall pay $4 for the privilege of saving the railroad company $4. Mr. Patterson, summarizing the points in favor of the charges said: "The trap-car saves drayage running from 30 cents to a dollar a ton; gives additional time under the car service rules; enables the loading of carloads and less-than-carloads from the same point in the warehouse regardless of weather conditions, without drayage; enables the shipper to locate at any distance he desires from the freight house without incurring additional drayage expense; secures expedition in the movement of cars to transfer points and, finally, saves the rough handling incident to drayage.

Senator Bryan Opposed to Public Ownership

N. P. Bryan, United States Senator from Florida, was one of the principal speakers at the second annual banquet of the Jacksonville (Fla.) Traffic Club on April 12, speaking on the subject of "Government Ownership."

"There is no reason for the government of the United States to engage in private business," he said. "Government ownership destroys private initiative. . . . The business of the government is politics and in conducting its own business it has no respect for revenues and profits. It is awfully easy to be generous with other people's money. While business men in all lines have been economizing in every way possible during the present war and hard times, see what happened at the postoffice department! This is one great business of the government that really shows a profit. The postmaster general wanted to save the trifling sum of $7,000,000, but 44,000 rural postal employees objected, they wanted their pay raised, and they got it. When 44,000 people in hard times like these can affect the entire nation, what would happen if the million and one-half federal employees united with the three million other employees now working for private concerns and were suddenly transported under government ownership? They would control the balance of power in the country. There would soon be no business—it would be all politics. You cannot legislate for New York state, and make those laws suit the people of Florida."

Other speakers at the banquet were Charles H. Mann, president of the Jacksonville Chamber of Commerce; W. B. Stillwell, of the Southern Pine Company, Savannah, Ga., and W. E. Kay, assistant general counsel of the Atlantic Coast Line.

Illinois Railway Officers Urge Higher Passenger Fares

A large delegation of Illinois railway officers appeared at a hearing before the senate and house committees on public utilities of the Illinois legislature on Wednesday to urge the passage of the bill to increase the state passenger fare from 2 to 2½ cents a mile. President C. H. Markham of the Illinois Central presented the arguments of the railroads in an address in which he pointed out that the railroads have stated their case to the people and that petitions signed by over 75,000 voters of the state, as well as resolutions passed by 101 different commercial and civic organizations, favoring an increase in the passenger fare upon proper showing by the railroads that an increase is reasonable have been addressed to the legislature. He said that there are only 13 out of 48 states in the union that have in effect a maximum passenger rate of two cents a mile, and their population per mile of railroad averages 472. In Illinois the population per mile is 491. In eight eastern states with a population per mile of 1,036 the average maximum fare per mile is 2½ cents, while for the remaining 27 states the fare ranges from 2½ to 6 cents. To show that the 2-cent law has not stimulated travel, he pointed out that the increase in passengers carried per mile for the year ending June 30, 1907, compared with the year ending June 30, 1903, was 22.73 per cent, while for the year ending June 30, 1913, the increase in passengers carried per mile over 1909 was only 17.43 per cent.

To show that the 2-cent a mile rate in Illinois has not been profitable to the railroads he presented compilations covering 13 of the principal lines with an aggregate mileage of 7,753 miles, or 60 per cent of the total, and a valuation within the state of Illinois of $590,204,336, or an average per mile of $76,122. The total net income of these roads was equivalent to 3.99 per cent on the valuation fixed for the purpose of taxation, and the passenger proportion of the value was $175,473,651, and net railway operating income for the year 1914 from passenger traffic was equivalent to a return of 3.6 per cent on the value. Assuming that passenger traffic should earn a return of 7 per cent, he said, the passenger traffic earned 7 per cent only on 51.42 per cent of the value as fixed for taxation, leaving $85,238,671 of value on which no return whatever was earned. "This conclusively proves," he said, "that a maximum passenger rate of two cents is entirely inadequate and it is extremely doubtful whether a 2½-cent rate would yield a fair return on the value of the property devoted to public use in the transportation of passengers."

A. J. Earling, president of the Chicago, Milwaukee & St. Paul, presented an argument against train limit legislation. Hale Holden, president of the Burlington, presented an argument in favor of 2½-cent passenger fares and against the train limit bill. Among other railway executive officers who appeared before the committee were Presidents Gardner of the Northwestern; Felton of the Chicago Great Western, and Bierd of the Alton; A. M. Schoyer, vice-president of the Pennsylvania Lines, and Receivers W. I. Jackson of the Chicago & Eastern Illinois; E. F. Kearney of the Wabash, and W. L. Ross of the Toledo, St. Louis & Western.

Six Months Operation on the Panama Canal

The first half year of commercial operation of the Panama Canal was completed on February 14, the canal having been opened to commercial traffic on August 15, 1914. During that period, according to the Canal Record, 496 vessels other than canal vessels and launches passed through the canal, carrying a total of 2,367,244 tons of cargo. Their distribution over the most important routes is shown in the following table:

Route.	Number of vessels	Cargo tonnage
United States coastwise, eastbound	97	499,439
United States coastwise, westbound	109	493,272
United States Pacific coast to Europe	66	444,855
Europe to United States Pacific coast	16	59,516
South America to United States and Europe	69	378,386
United States and Europe to South America	31	128,922
United States Atlantic coast to Far East	48	287,782
Far East to United States Atlantic coast	2	14,500
Miscellaneous routings	13	60,572
Vessels without cargo	45	.....
Total	496	2,367,244

Of the total, 252 vessels moved eastbound, carrying 1,340,625 tons and 244 vessels moved westbound carrying 1,026,619 tons. Slightly over 41 per cent of the cargo handled was in movement between ports of the United States. Over 21 per cent of all cargo was in movement between the Pacific coast of North America and Europe, and approximately 21 per cent was on the route between the west coast of South America and the seaports on the Atlantic seaboard of the United States and Europe. Traffic between the Atlantic seaboard and the Far East amounted to over 12 per cent of the total. The six principal commodities passing through the canal were, in order of their tonnage: Grain, nitrates, coal, refined petroleum products, lumber and cotton, and these six commodities together formed approximately one-third of the total tonnage. The grain shipments amounted to 303,124 tons, of which all but 15,733 tons were shipped from the east coast of the United States and Canada. Nitrates shipped from the west coast of South America to various ports in the United States and Europe amounted to 204,441 tons. Coal, all moving to the Pacific coast, aggregated 151,745 tons, of which 83,081 tons were shipped from the Atlantic seaboard and 68,664 tons from the United Kingdom. Shipments of lumber amounted to 56,078 tons. All but 600 tons were from the west coast of North America. Cotton shipments amounted to 38,239 tons, from the Atlantic seaboard of the United States to the far East.

The toll levied during the six months period amounted to $2,126,832.

A press despatch from Panama, April 15, says that up to April 1 tolls on the canal amounted to $2,894,300; and that the total cost of operation and maintenance during the same period was $3,020,000, leaving a deficit of $125,700.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Rates on Coke to Canton, Ill,

Parlin & Orendorff Company v. Cleveland, Cincinnati, Chicago & St. Louis, et al. Opinion by the commission:

The commission finds that a carload rate of $1.60 a ton on coke from Indianapolis, Ind., to Canton, Ill., is not unreasonable or discriminatory. Complaint dismissed. (33 I. C. C., 442.)

Rates for Compartments

Alfred Mosely v. Atchison, Topeka & Santa Fe. Opinion by the commission:

The commission finds that defendant's passenger-fare rule under which a minimum of one and one-half first class tickets is required for the exclusive use of a compartment on "California limited" trains is not unreasonable. (33 I. C. C., 521.)

Rates on News Print Paper to Oklahoma Points

Corporation Commission of Oklahoma v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Hall:

The commission finds that the fifth class rate of 57 cents a 100 lb. on news print paper from Galveston to Oklahoma City is unreasonable and the following rates are prescribed for the future: to Oklahoma City and McAlester, 38 cents; to Muskogee and Lawton, 40 cents, and to Tulsa, 42 cents. (33 I. C. C., 503.)

Rail-and-Water Rates Through Gulf Ports on Grain

Tampa Board of Trade v. Alabama & Vicksburg et al. Opinion by Commissioner Meyer:

The commission finds that the joint through rail-and-water rates on grain and grain products, from Ohio and Mississippi river crossings and other points of origin to Tampa, Fla., via New Orleans and the Gulf & Southern Steamship Company and via Mobile and the Mallory Steamship Company are unreasonable in so far as they exceed the present rail rates to the ports by more than 10 cents per 100 lb. (33 I. C. C., 457.)

Telegraph and Cable Rates

W. N. White Company v. Western Union Telegraph Company. Opinion by Commissioner Hall:

The commission finds that defendant's standard rates for the transmission of messages by telegraph from New York to San Francisco and by cable from New York to points in England are not unreasonable or discriminatory. The attack on the San Francisco rates was based chiefly on the fact that press messages are accorded lower rates. The decision says: "The right of carriers subject to the act to initiate their charges is too well established to need citation of authority. Such charges are prima facie reasonable, except where otherwise provided by law. Congress has here provided that messages may be classified into 'day, . . . press, . . . and such other classes as are just and reasonable,' and that different rates may be charged for the different classes." (33 I. C. C. 500.)

Rates on Asphaltum, etc., from Pacific Coast Points to Atlantic Ports

Opinion by the commission:

The Southern Pacific and its affiliated lines are authorized to establish a rate of 40 cents a 100 lb. in carloads, minimum 80,000 lb., on asphaltum, barley, beans and canned goods from San Francisco, San Pedro and Wilmington, Cal., moving over the Sunset Gulf route via rail to Galveston, Tex., and steamer thence to Charleston, S. C., Baltimore, Md., Philadelphia, Pa., New York and Boston, Mass., while continuing higher rates from, to and between intermediate points.

Relief from the fourth section was asked because of the competition of water carriers using the Panama Canal. It was shown that this route had lost to the canal route since July 1, 1914, two thirds of its former proportion of asphaltum traffic, three-fourths of its proportion of bean traffic, and two-thirds of its proportion of traffic in canned goods. It was also shown that this very low rate was at least sufficient to cover the "out of pocket" cost on this traffic. (33 I. C. C., 480.)

Ownership of Schooner Pasadena

Opinion by Commissioner Clark:

The schooner Pasadena is owned by the Albion Lumber Company, a corporation, all the stock of which is owned by the Southern Pacific. It is operated principally between Albion and San Francisco, and primarily for the purpose of moving the lumber company's products to market. It also operates between other ports.

The commission finds that so long as the line of the Northwestern Pacific (in which the Southern Pacific owns a one-half interest) between Albion and Christine is not extended to connect with its line between Willits and Sausalito, neither it nor the Southern Pacific does or can compete with the Pasadena in its operation between the ports of Albion and San Francisco, and that the continued ownership and operation of the Pasadena by the Southern Pacific through the Albion Lumber Company between Albion and San Francisco is not and will not be in violation of section 5 of the act to regulate commerce, as amended by the Panama Canal act.

It is further held that in operating the boat between San Francisco and San Pedro and Redondo the Southern Pacific may compete with the Pasadena. In so far as the petition seeks a continuance of this service, it is denied as of May 1, 1915. (33 I. C. C., 476.)

STATE COMMISSIONS

The Board of Public Utilities of New Jersey, having considered a complaint of lack of drinking water on excursion trains between Camden and Atlantic City, recommends that suitable coolers be provided in at least one car of every three on excursion trains.

The California Railroad Commission has issued an order approving a modified traffic agreement between the Southern Pacific and the San Pedro, Los Angeles & Salt Lake by which the latter company will be permitted to engage in local passenger and freight business on the Southern Pacific line between Riverside and San Bernardino. Heretofore the Salt Lake line, although having traffic rights between those points, was not permitted to handle local traffic.

PERSONNEL OF COMMISSIONS

James O. Carr, Republican, of Schenectady, a member of the legal department of the General Electric Company, has been appointed a member of the New York State Public Service Commission, Second district, to succeed Martin S. Decker, Democrat, whose term expired on February 1. Mr. Carr has been with the General Electric for fifteen years.

COURT NEWS

Commutation Tickets—Violation of Stipulations

The Supreme Court of New Jersey holds that the right of a carrier to take up a commutation ticket improperly used is not limited to the occasion when it is presented. If the condition has been violated, the ticket may be taken up subsequently when presented by the owner himself. Trupin v. Central of N. J. (N. J.) 93 Atl. 93.

Pullman Porter Not Railroad Employee

The Supreme Court of the United States, in an action for personal injuries by a Pullman sleeping car porter on an interstate train against the railroad company, holds that the plaintiff was not an employee of the railroad within the meaning of the federal employers' liability act. It was insisted for the plaintiff that he should be regarded as the employee of the railroad because of the fact that, in the case of passengers coming on the train after three o'clock in the morning, he received the railroad

ticket or fare, which he placed in an envelope and afterwards gave to the train conductor. This, however, was an obvious accommodation to the passengers in the Pullman car, and in any event it was merely an incidental matter which could not be deemed to qualify the character of the plaintiff's employment as viewed from the standpoint of the statute.—Robinson v. B. & O. (April 5).

Unguarded Space Between Platform and Cars—Negligence and Contributory Negligence

Action was brought in the federal courts by a passenger on the New Haven road, who was injured at the Grand Central Terminal, New York, in attempting to alight from a car. The station platform was constructed for the new cars, from which the passenger can step to the station platform on the same level. But with the old style of cars there was a distance of 3 ft. between the station platform and that of the car. The company had porters to bridge this open space by putting down a movable bridge over which the passengers could pass. On the occasion in question no board or plank had been put in place, and in stepping from the car the plaintiff fell into the opening. The open space being only 3 ft., he could easily have stepped across it had he observed it. Although some twelve passengers preceded him, he was the only one who fell. He testified that he could have seen the open space had he been looking, but that he did not look. He relied on the bridge being there as usual. One of the company's defenses was contributory negligence. It was held by the circuit court of appeals for the Second circuit, that negligence of the company and contributory negligence of the plaintiff were both questions of fact for the jury, which found for the plaintiff.

Hours of Service Law

In an action for a violation of the hours of service law in the district court of Idaho a locomotive engineman was regularly employed in moving interstate commerce; but for a period of 59 days was on a work train, wholly within the state of Idaho, filling (not repairing) a bridge on an interstate line; and thereafter he went back into interstate commerce. On the work train he was permitted to remain on duty more than 16 hours. It was held that the road was not thereby guilty of a violation of the act. The court said that this was not a case where there was a commingling of service, where the employee was one hour or one day at work in interstate and another hour or another day in intrastate. If the contention of the government were correct, an employee who has once rendered service such as is covered by the act must always be deemed to be within the provisions thereof, regardless of the time which has elapsed since he ceased to render such service, at least so long as he remains in the employ of the same company. United States v. Chicago, M. & St. P., 219 Fed. 632.

Failure to Give Crossing Signal—Frightening Horses

The Supreme Court of South Carolina holds that a statute requiring the sounding of bell and whistle 500 yards from railroad crossings and public places was intended for the protection of persons using the highway or public place, and did not give a right of action to the plaintiff, who was working in a field near the track, and about 200 yards from the crossing when injured by fright of his horse by the passing of a train which had failed to give the crossing signal. The court distinguished the case from that of Clifford v. Southern Railway, 87 S. C. 325, where the plaintiff was traveling along the highway, and was on the crossing before she had any warning of the approach of the train, and had just cleared the track when the train passed, without signal, and missed the hind wheels of her buggy only a few inches. Her horse was so frightened that he threw her out and injured her. In Miss Clifford's case, the company owed her the duty, in her situation, to give the crossing signals. In this case, the company owed no such duty to the plaintiff, because his injury had no connection with the use or intended use of the crossing. In some of the cases such statutes are given a more restricted construction than that of the South Carolina court, and it is held that the signals are required to protect travelers only against actual collision with passing engines or cars. Hutto v. Southern Ry. (S. C.) 84 S. E. 719.

"Attractive Nuisance" Doctrine

In an action for personal injuries to a child the plaintiff based his right to recover on the "turntable" cases, or the "attractive nuisance" doctrine. The defendant railroad company maintained over a street a viaduct and a retaining wall 20 inches wide, with a smooth surface on top. One end of the wall was about 28 inches above the street, and from that end it gradually ascended until it reached a height of 15 ft. Children found the wall attractive, and were in the habit of climbing upon it; which fact was known to the defendant. The child injured climbed upon the wall and fell into the street below. It was held by the Kentucky Court of Appeals that the railroad company did not maintain a dangerous instrumentality attractive to children; it need not construct barriers to prevent children from climbing on the wall, and was not liable for the child's injuries. The only sense in which the wall could be said to be dangerous was that it was easy to climb, and easy to fall from; but so is every tree, pole, fence, ladder or railing. If spikes had been placed on it, as suggested, and the child had been injured by them, there would have been greater reason for holding the defendant liable. If a fence or guard rail had been constructed at the lower end of the wall, it would only have added to the danger by furnishing something else to fall from.—Coon v. Kentucky & I. T. (Ky.) 173 S. W. 325.

Wooden Coal Cars Not Dangerous Appliances—Customary Use

While engaged in unloading a wooden coal car, the trap doors in the bottom of which had become swollen with the wet coal and damp weather, an employee, after striking a refractory door with his iron bar, fell through the opening with the coal into the bunkers below, receiving injuries from which he died. In an action for his death it was shown that the cars used were such as were commonly used by all railroads for such purposes, and that trap doors quite commonly became swollen so as not to open by the removal of the fasteners; and it was not shown that there was any other method of forcing open the doors which would be attended with less danger than the method used. The Supreme Court of Washington, therefore, held that it was not negligence in itself to use the cars. An employer can, without becoming an insurer against accidents to his employees, make use of the common appliances in the prosecution of his business. The question in such cases is not, Would something else have been better? but is rather, Are the appliances and methods used inherently dangerous, and are the dangers concealed from the employees? (Bjornsen v. Northern Pacific (Wash.), 146 Pac., 575.)

Free-haul and Pay Lines—Rates Chargeable for Through Shipment

In an action by the Southern Pacific against the government the appeal to the United States Supreme Court presented but a single question of law, as to the legal rate of compensation to which the company was entitled for the transportation of government property and troops over a continuous line of road, part of which is free-haul and the remaining part is pay-line. Between August, 1897, and March, 1902, the railroad transported for the United States persons and property over the free-haul part of its line from Roseville Junction to Portland, a distance of 664 miles "from points on either side thereof to points on the other side; for example, from San Francisco . . . to Portland, via Rosedale Junction." For such services the company charged nothing for haulage over the free portion of the road, but exacted the local rate between San Francisco and Roseville Junction. The government insisted that it was entitled to the benefit of the San Francisco-Roseville proportion of the through rate. The company argued that, while there is a continuous rail line between San Francisco and Portland, the line itself, from the standpoint of compensation or pay to the company, breaks at Roseville Junction; south of that point it is pay line; north thereof it is free-haul. The court decided that this proposition was erroneous, and that it was not the character of the movement that fixed the rate, but the rate which determined the character of the movement. Apart from this, it held that to accept the company's proposition would give rise to a violation of the act of Congress governing the movement of traffic over the pay line, which gives the government the right to ship over the road at rates not to exceed the amounts paid by private

parties. Judgment for the government was therefore affirmed.—Decided April 12, 1915.

Stopping Passenger Trains at Small Stations—Invalid Statute

The decision of the Supreme Court of the United States reversing the Supreme Court of Wisconsin as to stopping through trains at small stations was briefly noticed in the *Railway Age Gazette* April 16, page 868. The case was brought up by the railroad, the Chicago, Burlington & Quincy, asking a review of the judgment of the State Court, which had sustained an order of the railroad commission requiring the railroad, under a state law, to stop two of its passenger trains, each way daily, at Cochrane. The statute requires a station to be maintained at every village having a post office and containing 200 inhabitants, within one-eighth of a mile of the road, and if four or more trains were run each way daily to stop at least two. The daily passenger service at Cochrane was one passenger and one freight, carrying passengers, each way. The population of the village is about 260. The court holds that the test of the statute was purely artificial. The number of trains cannot be determined by the local needs of a village. This railroad runs only interstate trains. The line is through a sparsely settled country, and 90 per cent of the business is interstate, and the trains assigned to intrastate business are not self-sustaining. The revenue at Cochrane from the passenger traffic for the year ending July, 1911, was only $1,752, of which $986 was from intrastate and $766 from interstate business. The court held the statute invalid and reversed the judgment of the Wisconsin Supreme Court.—Decided April 12, 1915.

Interchange of Cars With Electric Road

In the early part of the year 1908 petitions were filed before the Michigan Railroad Commission by certain merchants of Ortonville and Goodrich, asking for a connecting track between the Michigan Central and the Detroit United at Oxford for the interchange of cars under section 7 (b) of Michigan Publict Acts 1907, No. 312, providing that "where it is practicable and the same may be established without endangering the equipment, tracks or appliances of either party, the commission may require steam and interurban railroads to interchange cars, carload shipments, less than carload shipments, and passenger traffic. . . ." The Michigan Central answered denying that it would be practicable to construct and maintain such a physical connection, and denying the authority of the commission. The Detroit United denied the practicability of interchanging carload shipments (supposing a track to have been established), without unreasonable expenditure of money in changing its road and equipment. There was a full hearing. The commission found the construction and maintenance of the connection to be feasible and the expense of construction $500. It also found the proposed interchange to be reasonable from the point of view of the Michigan Central. An order was made requiring the connection to be made, and thereafter an interchange in accordance with the provisions of section 7. The physical connection was installed, and no question was afterwards made respecting this. But the Michigan Central complied, to the extent of installing the physical connection, under protest. The Detroit United was willing and able to accept cars and carloads of freight [for delivery within belt line limits] but the Michigan Central had so far refused to deliver freight to the Detroit United. There was no controversy on the other parts of the order. The Supreme Court of Michigan (168 Mich. 230) awarded a peremptory writ of mandamus directing the Michigan Central with respect to intrastate traffic, to make the interchange. This judgment was brought under review by the Supreme Court of the United States. The court holds that the state has power to make a reasonable order requiring a carrier to permit empty or loaded cars owned by it to be hauled from its line on the connecting line for the purposes of loading or delivery of intrastate freight, and the same with the cars of other carriers. The order was held only to apply to intrastate traffic, to which the jurisdiction of the commission is limited, and the presumption must be indulged, until the contrary is made to appear, that the state will not so construe or enforce the order as to interfere with or obstruct interstate commerce. The judgment was affirmed.

Railway Officers

Executive, Financial, Legal and Accounting

D. E. Hedges, auditor of the Tennessee, Alabama & Georgia at Chattanooga, Tenn., has resigned.

M. A. Johnson has been appointed auditor of receipts of the Missouri, Kansas & Texas of Texas, with headquarters at Dallas, Texas, succeeding S. H. McCartney, resigned.

The appointment of H. U. Mudge, president of the Chicago, Rock Island & Pacific, and Jacob M. Dickinson as receivers of that road is commented on elsewhere in this issue.

S. H. McCartney, auditor of receipts of the Missouri, Kansas & Texas of Texas, has been appointed secretary and auditor of the Nevada-California-Oregon, with headquarters at Reno, Nev.

Edward S. Moore has resigned as vice-president in charge of purchases of the Chicago, Rock Island & Pacific, with office at Chicago. At the annual meeting on April 12, he declined re-election as a director, and he also declined re-election as vice-president.

H. I. Miller, chairman of the board of the Buffalo & Susquehanna Corporation, receiver of the Buffalo & Susquehanna Railway, vice-president of the Mexico North Western and of the Denver & Salt Lake, has been elected also president of the Tennessee & North Carolina, with headquarters at New York. Mr. Miller resigned recently as president of the New Orleans Great Northern.

William E. Farris, who has been elected third vice-president of the New Orleans Great Northern in charge of operation, with headquarters at New Orleans, La., was born on November 22, 1870, at Sandborn, Ind., and was educated in the common schools. He began railway work on August 1, 1891, as a telegraph operator and agent on the Evansville & Terre Haute. He remained in the service of this company at various places until April, 1905, when he was appointed agent in charge of the Evansville & Terre Haute and the Chicago & Eastern Illinois terminals at Terre Haute, Ind. On December 31, 1910, he resigned from that position to go to the Buffalo & Susquehanna as assistant general freight and passenger agent; one month later he was promoted to general freight and passenger agent, and subsequently served also as purchasing agent of the same road until his recent election as third vice-president of the New Orleans Great Northern, as above noted.

W. E. Farris

L. R. Wood, assistant auditor of the Oregon Short Line, has been appointed auditor, with headquarters at Salt Lake City, Utah, succeeding C. J. McNitt, who has been retired under the pension rules of that company on account of continued ill health. P. L. Williams, general attorney of the Union Pacific for Utah and general attorney of the Oregon Short Line, with office at Salt Lake City, will be retired on May 1 under the pension system of the Union Pacific, and will be succeeded by George H. Smith, who has been assistant to Mr. Williams.

Walter P. Cooke, first vice-president and general counsel of the New Orleans Great Northern at Buffalo, N. Y., has been elected president, with headquarters at Buffalo, vice H. I. Miller,

resigned. Charles I. James, second vice-president at Baltimore, Md., has been elected first vice-president with headquarters at Baltimore; A. C. Goodyear, third vice-president at Buffalo, has been elected second vice-president with headquarters at Buffalo, and W. E. Farris, general freight and passenger agent, and purchasing agent, of the Buffalo & Susquehanna at Buffalo, N. Y., has been elected third vice-president of the New Orleans Great Northern, with headquarters at New Orleans, La.

Operating

J. E. Lovejoy has been appointed assistant superintendent of the Phoenix division of the Arizona Eastern, with headquarters at Phoenix, Ariz., vice J. G. Lindsay, assigned to other duties.

John Kirk, superintendent of terminals of the Elgin, Joliet & Eastern at Gary, Ind., has been appointed superintendent of the Gary division, with office at Gary, and C. H. Doorley, assistant superintendent of terminals at South Chicago, Ill., has been appointed superintendent of terminals at East Joliet, Ill.

W. H. Davidson, assistant trainmaster of the Delaware & Hudson at Albany, N. Y., has been appointed trainmaster of the Champlain division, with office at Plattsburg, vice J. H. Galivan, deceased. F. R. Griffin, assistant trainmaster at Plattsburg, has has been appointed assistant trainmaster of the Saratoga division, with office at Albany, vice Mr. Davidson, and the office of assistant trainmaster, Champlain division, has been abolished.

Traffic

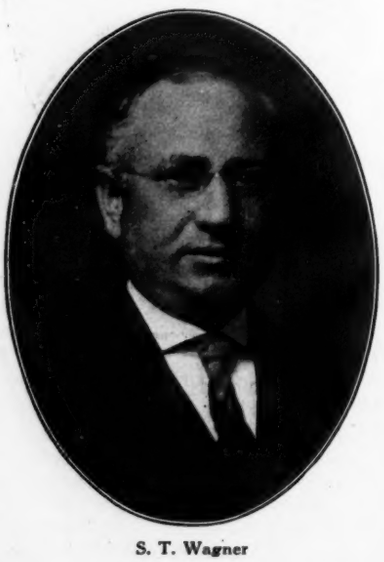
The office of division freight agent on the Southern Railway at Selma, Ala., has been discontinued, and E. M. Jordan has been appointed commercial agent, with headquarters at Selma.

Engineering and Rolling Stock

H. B. Cartwright, acting assistant engineer of the Seaboard Air Line at Jacksonville, Fla., has been appointed assistant engineer, with office at Jacksonville, vice L. R. Hoyt, assigned to other duties.

H. H. Vaughan, assistant to vice-president of the Canadian Pacific at Montreal, Que., at his own request, has been released from the immediate supervision of the construction and maintenance of locomotives and cars, in order that he may devote his attention to important contract engagements that he has become interested in. He is being retained as consulting engineer, and W. E. Woodhouse, superintendent of motive power, Eastern Lines, at Montreal, has been appointed chief mechanical engineer.

Samuel Tobias Wagner, whose appointment as chief engineer of the Philadelphia & Reading with headquarters at Philadelphia, Pa., has already been announced in these columns, was born in 1861 in Philadelphia. He graduated from the University of Pennsylvania in 1881 with the degree of bachelor of science, and was awarded the senior civil engineering prize; and three years later the degree of civil engineer was awarded to him. Mr. Wagner was in the employ of the Phoenix Iron Company consecutively as draftsman, assistant superintendent of shops and superintendent of shops until 1893, except for about one year when he was resident engineer of erection on the construction of the Louisville & Jeffersonville bridge over the Ohio river. From 1894 to 1900 he was assistant engineer on behalf of the city of Philadelphia in charge of the design and construction of the Pennsylvania avenue subway and tunnel, on the line of the Philadelphia & Reading in Philadelphia. After that he was engaged for a number of years in the installation of the water supply for the city of Philadelphia. Mr. Wagner entered the service of the Philadelphia & Reading in 1902 as assistant engineer, and was engaged on grade crossing work and other improvements in Philadelphia until his recent appointment as chief engineer, as above noted.



S. T. Wagner

B. J. Schwendt, signal engineer of the Toledo & Ohio Central, and the Zanesville & Western, has been appointed superintendent of telegraph and signals of the same roads, retaining jurisdiction over the signal department, with headquarters at Columbus, Ohio, effective on April 1, 1915. Mr. Schwendt was born July 25, 1884, at Greenspring, Ohio, and obtained his early education in the grammar and high schools of that place. In March, 1902, he went to work for the Minot Light & Telephone Company, Minot, N. Dak., as assistant plant fireman, from which position he was advanced by successive steps to station helper, electrician, wireman, lineman, installer, and in August, 1903, was given charge of the telephone department. During the first three months of 1903 he was granted leave of absence and was employed by the ice contractor of the Great Northern, cutting, shipping and housing ice at points between Larimore, N. D., and Seattle, Wash. In November, 1903, he entered Ohio State University at Columbus, graduating in 1907 with the degree of mechanical and electrical engineer. During the summer months of 1905-6 he was employed by the Allis-Chalmers Electrical Company, in the Bullock works at Cincinnati, Ohio, as winder and assemblyman. In June, 1907, he entered the service of the Union Switch & Signal Company and was engaged in the installation of electric and mechanical interlockings and automatic signals on the Pennsylvania lines West, the Baltimore & Ohio, and the Erie. During this time he served in various capacities, from laborer up. In March, 1909, he was appointed supervisor of signals for the Toledo & Ohio Central, Hocking Valley, Kanawha & Michigan, and the Zanesville & Western, with headquarters at Columbus, Ohio. On January 11, 1912, he was appointed signal engineer of the Toledo & Ohio Central and Zanesville & Western.

B. J. Schwendt

OBITUARY

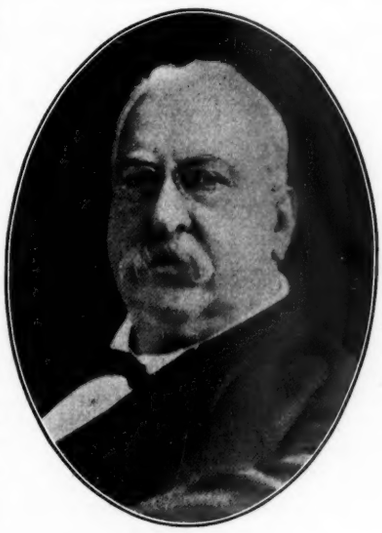
Robert S. Brown, district passenger agent of the Baltimore & Ohio Southwestern at Louisville, Ky., died on April 21, at his home in that city at the age of 61.

Charles E. Potts, formerly until July, 1913, assistant treasurer of the Chesapeake & Ohio at Richmond, Va., died at his home in Ashland, on April 19, at the age of 63.

Charles Walter Rhodes, assistant treasurer of the Baltimore & Ohio, died suddenly on April 14, in Baltimore, Md. He was born on January 28, 1853, near Westminster, Md., and in February, 1869, entered the service of the Baltimore & Ohio.

Burton Johnson, formerly from January, 1897, to November, 1906, general freight agent of the Wisconsin Central, died at his residence in Chicago on April 18, aged 62 years. Mr. Johnson entered railway service in 1879 with the Chicago & North Western as a clerk in the general freight department and remained with that road until January, 1897, at which time he held the position of second assistant general freight agent. He then went to the Wisconsin Central as general freight agent.

Colonel Alexander Boyd Andrews, first vice-president of the Southern Railway, with office at Raleigh, N. C., died on April 17, at his home in that city. He was born on July 23, 1841, in Franklin county, N. C., and from 1859 to 1861 he served as purchasing agent, paymaster and general superintendent for the contractor on the Blue Ridge Railroad. After the Civil war he leased, equipped and operated a railway ferry for the Raleigh & Gaston, now a part of the Seaboard Air Line, and the Petersburg Railroad, now a part of the Atlantic Coast Line, at Gaston, N. C. From July, 1867, to November, 1875, he was superintendent of the Raleigh & Gaston and the Raleigh & Augusta, and then was superintendent of the North Carolina division of the Richmond & Danville. He was elected president of the Western North Carolina in 1881, and completed that road. From 1878 to 1880 he was also superintendent of the Atlantic & North Carolina, now a part of the Norfolk Southern, and superintendent of the North Carolina division of the Richmond & Danville. In 1883 he was appointed assistant to president of the Richmond & Danville, remaining in that position until 1886, when he was elected third vice-president, and from December, 1889, to June, 1894, was second vice-president of the same road. From July, 1892, to June, 1894, he was also general agent for receivers of the same road. He then went to the Southern Railway as second vice-president, and since October 1, 1895, was first vice-president of that road, also of the Mobile & Ohio, and the Alabama Great Southern, and president of the Danville & Western, Blue Ridge, Tallulah Falls, and Augusta Southern.



A. B. Andrews

Ivory Coast Railway.—The railways on the Ivory Coast will have in the future a great effect on the commercial development of the Ivory Coast. The scheme for the railways in this colony is that one railway (the main line) starting from Abidjan is to go to Bouake, and from there be pushed on to Bobo-Dioulasso, crossing the river Volta in the Upper Sudan. A branch line will run from Dimbokoro to Daloa (in the administrative circle of Upper Sassandra), and passing through Man (Touba circle) will connect with the railway of French Guinea.

Indian Railway Operation.—The ratio of operating expenses to traffic receipts on the railways of British India stood in 1912 at 48.92 per cent. In consequence of the rise in wages in India the ratio has shown a certain tendency to increase of late years; but in 1912 it experienced a considerable reduction and approximated to the level at which it stood ten years previously. The course taken by the ratio during the decade ending with 1912 inclusive was as follows:

Year	Per cent	Year	Per cent
1903	47.52	1908	60.24
1904	47.36	1909	56.06
1905	47.85	1910	53.10
1906	49.89	1911	53.17
1907	51.42	1912	48.92

The ratio has fluctuated considerably upon the principal Indian lines, being affected by their extent, their situation and current local labor conditions. Upon the Bengal & North-Western (one of the most prosperous of the Indian systems) the ratio was 34.16 per cent in 1912; upon the Bengal Dooars, 36.05 per cent; upon the Bengal & Nagpur, 45.74 per cent; upon the Bombay, Baroda & Central India, 49.67 per cent; upon the Burma, 59.47 per cent; upon the East Indian, 37.62 per cent; the Eastern Bengal, 59.14 per cent; the Great Indian Peninsula, 53.96 per cent; the Madras & Southern Mahratta, 54.53 per cent; and the South Indian, 51.68 per cent.—*Engineering.*

Equipment and Supplies

LOCOMOTIVE BUILDING

The Kansas City Southern is reported to be in the market for 6 switching locomotives.

The Rapid City, Black Hills & Western has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

The Algoma Lumber Company, Algoma, Ore., has ordered one Prairie type locomotive from the Baldwin Locomotive Works

The Champion Lumber Company, Philadelphia, Pa., has ordered 2 90-ton Shay geared locomotives from the Lima Locomotive Corporation.

The Pennsylvania Lines West have issued inquiries for 50 freight locomotives. These are in addition to the 144 locomotives which will be required by the Pennsylvania Lines East of Pittsburgh.

The Pennsylvania Railroad has issued inquiries for material for 76 road and 68 switching locomotives, which it will build in its Juniata shops. As the Pennsylvania Lines West have also issued inquiries for 50 locomotives, this will make a total for all the Pennsylvania Lines of 194 locomotives.

The Illinois Central has ordered 4 Mikado type locomotives from the Lima Locomotive Corporation. These are in addition to the 50 Mikado type locomotives recently ordered from the same company. They will have 27 in. by 30 in. cylinders, 63-in. driving wheels, a total weight of 284,400 lb., and a weight on drivers of 213,100 lb.

CAR BUILDING

The Lehigh Valley will reinforce 2,000 freight cars with steel underframes.

The Wilkesbarre & Hazelton has ordered 10 interurban cars from the J. G. Brill Co.

The Chicago, Indianapolis & Louisville is having 300 box cars rebuilt by the Haskell & Barker Car Company.

The St. Louis, Troy & Eastern has ordered 300 gondola cars from the American Car & Foundry Company.

The Chicago & North Western, which was reported in the *Railway Age Gazette* of last week, as being in the market for 2,500 freight and 50 passenger cars, has issued inquiries for 2,000 steel underframe box cars, 50 steel underframe caboose cars and 50 all-steel passenger cars. These cars are to be delivered this summer and the estimated expenditure will be about $3,000,000.

The Pennsylvania Railroad's passenger equipment program calls for 146 all-steel passenger cars divided as follows: 30 coaches, 54 combination passenger and baggage cars, 42 baggage and mail cars, 15 baggage and express cars and 5 horse express cars. Bids were asked on Saturday for building 90 of these cars and inquiries issued for materials for the other 56, which will be built in the company's shops at Altoona. This equipment will be purchased for replacement purposes. As the Pennsylvania Lines West have also asked prices on 35 all-steel passenger cars, there will be a total for all the Pennsylvania Lines of 181 cars.

The Pennsylvania Railroad has issued inquiries for 7,643 freight cars, to be built by outside companies and for materials for 2,102 freight cars to be built at the company's shops at Altoona. The freight car program calls for 2,000 all-steel box cars, 2,500 gondola cars, 4,919 coal and coke cars, 224 refrigerator cars and 102 flat cars. The company plans to build in its car shops at Altoona, 1,000 of the 2,000 box cars, 1,000 of the 2,500 gondola cars and all of the flat cars. These 9,745 freight cars will be for replacement purposes only. As the Lines West have also issued inquiries for 6,500 freight cars, the total freight

car requirements for all the Pennsylvania Lines aggregate 16,245 cars.

The Pennsylvania Lines West have issued inquiries for 6,500 freight cars and 35 all-steel passenger cars, these being in addition to the 9,745 freight cars and 146 passenger cars which will be required by the Lines East of Pittsburgh. The Lines West have some 90,000 freight cars, with an annual normal vacancy of 5,000 cars. Last year the Lines West ordered no new cars. Any cars which will be ordered this year will be replacements and not additions. The 6,500 freight cars will include 100 refrigerator, 1,500 gondola, 2,500 box, 2,300 hopper and 100 miscellaneous cars. The 35 passenger cars will be divided as follows: 6 dining cars, 10 coaches, 10 baggage and mail cars, 2 postal cars and 7 baggage cars.

IRON AND STEEL

The Lehigh Valley is in the market for a car wheel borer.

The Pennsylvania is in the market for two 100-ton electric cranes.

The Chicago, Rock Island & Pacific is in the market for approximately 30,000 tons of rails.

The Bay State Street Railway has ordered 1,200 tons of girder rails from the Pennsylvania Steel Company.

The New York, Chicago & St. Louis has ordered 1,500 tons of bridge material from the Pennsylvania Steel Company.

The Delaware, Lackawanna & Western has ordered a 25-ton gantry crane from the Toledo Bridge & Crane Company.

The Missouri, Oklahoma & Gulf is reported to have ordered 2,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

The Chicago, Burlington & Quincy is inquiring for three wheel presses, a forging machine, a double-ended punch and shear, a 5-ft. radial drill, six shapers, one slotter, 11 lathes of various kinds and sizes, tool grinders, saws, etc., and two 240-hp. water tube boilers.

SIGNALING

The New York Central has contracted with the General Railway Signal Company, Rochester, N. Y., for the complete installation of a 224-lever electric interlocking plant at Tower 31, Utica, N. Y. This machine will be the G. R. S. standard model 2 with unit levers. The switch movements will be Model 4, giving a dynamic indication, and the signals Model 2A.

Steel Cars in Egypt.—All-steel passenger cars are being adopted on the Egyptian State Railways. A first consignment of a recent order for 30 has been received from Leeds, England.

Why Not Investigate Merchants?—It is an easy matter and quite the popular one to roast the railroads, but how about the big merchants? It is announced in Chicago that Sears, Roebuck & Company recently declared an annual dividend of $20,000,000 and yet we have not heard of anyone who is in favor of a law curbing the rapacity of this octopus. We are told that the great mercantile house of Marshall Field & Company of Chicago took in more money last year than the entire system owned by the great Atchison, Topeka & Santa Fe Railway Company, and neither Congress nor any state legislature has been asked to get after Marshall Field & Co. and demand the conduct of the business on what is termed a reasonable return for the money invested, and nobody has had the temerity to arise and demand that Sears, Roebuck & Company or Marshall Field & Co. be made to give a full accounting as to capitalization, profits and the like. The Iowa Farmer does not know whether the railways are losing money. The claim is made that they are unable to get further credit. . . . They declare that they are able to prove this contention to the satisfaction of any unprejudiced jury if given an opportunity. Why not treat them as any other business enterprise would be treated and permit them to at least present the argument that will substantiate their contention for an advance in rates?—*Iowa Farmer.*

Supply Trade News

Munn & Co., patent attorneys, have removed their offices to the Woolworth building, New York.

Wilber H. Traver, manager of the mining department of the Chicago Pneumatic Tool Company, died in Houghton, Mich., on April 15.

The Du Pont Fabrikoid Company, Wilmington, Del., has moved its New York sales office from 90 West street to Room 1614 Equitable building, 130 Broadway.

William F. Gillies, formerly in charge of the New York sales branch of the Ingersoll-Rand Company, New York, has been appointed branch manager of the same company at Pittsburgh.

The White Enamel Refrigerator Company, St. Paul, Minn., has been awarded an order for Bohn all-steel collapsible bulkheads, Hatch ventilators and plugs for 500 refrigerator cars for the Atchison, Topeka & Santa Fe.

R. Harvey White, formerly signal engineer of the Chicago Railway Supply Company, Chicago, and at one time editor of The Signal Engineer, has joined the selling force of the National Carbon Company, Cleveland, Ohio.

A. J. Poole, formerly superintendent of motive power of the Seaboard Air Line, has become associated with the Galena Signal Oil Company in the capacity of railway expert, with headquarters in Atlanta, Ga., effective April 15.

W. B. Carnes, formerly in charge of the New York office of the Lima Locomotive Corporation, has been appointed western representative, with offices in the McCormick building, Chicago. He has been succeeded in New York by William T. Middleton.

The Bucyrus Company, South Milwaukee, Wis., has moved its southern sales office from Birmingham, Ala., to 1105 Hennen building, New Orleans, La. E. L. Byron, southern sales manager, will remain in charge, and R. S. Byron will be associated with him.

Marvin F. Wood, formerly of Wood & Van Nest, now has offices at Room 414, 30 Church street, New York. Mr. Wood is representing the new Washrite Compound for cleaning the exterior of passenger and baggage cars, and for polishing the interiors of cars and buildings.

Alexander Taylor has been promoted from assistant secretary to secretary of the Lake Superior Corporation, the Algoma Steel Corporation and subsidiary companies, succeeding Thomas Gibson, who recently became president of the Lake Superior Corporation. Mr. Taylor has also been made a director.

Luther Steadman Bent, at one time president of the Pennsylvania Steel Company and a director in numerous corporations, died of paralysis on April 19 at his home in Overbrook, Pa., at the age of 86. Mr. Bent became manager of the Pennsylvania Steel Company in 1874, and in 1880 was made president. He held that office until 1896, when he retired.

The Westinghouse Electric & Manufacturing Company has received an order from the Chicago & Milwaukee Electric for 15 quadruple equipments of type No. 557-A, 140 hp. motors with double end type "HLF" control. These equipments are to be placed in high speed passenger express service between Chicago and Milwaukee. The cars will be arranged for train operation.

The American Locomotive Company, which has been negotiating for some time for a large contract for shrapnel, is now supposed to have closed contracts with the Russian government for shrapnel aggregating $65,000,000 in value. The company has purchased $500,000 of the special machinery which will be necessary, and has had options on $500,000 worth more of such machinery for several weeks.

The Firth Sterling Steel Company, McKeesport, Pa., is running double time on the manufacture of shrapnel shells, turn-

ing out about 2,500 daily, and the National Tube Company, the Pressed Steel Car Company and a number of other companies in the Pittsburgh district are also said to be turning out from 1,000 to 3,500 shrapnel, each, daily. The Standard Steel Car Company is about to start work on a large order for shells.

Lee H. Parker has been appointed president of the Spray Engineering Company, Boston, Mass. Mr. Parker has had a wide experience in the engineering field, having been for a number of years with the General Electric Company, and for the past ten years with the Stone & Webster Engineering Corporation. He also has had considerable executive experience in representing large London interests in South America for many years.

The Lackawanna Steel Company has closed contracts for delivery to the Allies of 50,000 tons of shrapnel steel. According to the terms of the agreement 5,000 tons must be shipped every ten days. It has been reported that this company since the beginning of the war has received orders for 500,000 to 600,000 tons of shrapnel, the total value of these orders being estimated at from $22,500,000 to $27,000,000. The Carnegie Steel Company and the Crucible Steel Company of America have also obtained large orders for shrapnel steel.

Merrill G. Baker, whose appointment to the position of assistant general manager of sales of the American Vanadium Company was announced in the *Railway Age Gazette* of last week, was formerly assistant to the general manager of sales of the Cambria Steel Company. Mr. Baker was born in Indiana county, Pa., in 1880, from which his parents moved to Johnstown, Pa., in 1884. He worked his way through preparatory school, paying his expenses by doing night work as a telephone operator, and later attended Dickinson college, from which he graduated with the class of 1904. He entered the employ of the Cambria Steel Company on January 3, 1905. He worked in various of that company's operating departments until July, 1906, when he entered the sales department. In September, 1912, he was appointed assistant to the general manager of sales in charge of the rail and structural departments.

John S. Griggs, Jr., electrical and mechanical engineer, and David Moffat Myers, mechanical engineer, have consolidated their practices and formed the firm of Griggs & Myers, with offices at 110 West 40th street, New York, Mr. Griggs was for 12 years senior partner of the consulting firm of Griggs & Holbrook, New York. He has been in practice as a consulting engineer in New York for 20 years, and has made steam and electrical installations in several important office buildings and industrial plants. Mr. Myers was formerly mechanical engineer for the United States Leather Company, New York, in charge of the efficiency work in its steam plants. In 1906 he started a private consulting practice. He has specialized on the efficient operation and design of industrial plants, with special reference to steam and fuel economy and to the use of exhaust steam in the production of high over-all efficiency. He is also the author of "Preventing Losses in Factory Power Plants."

In the *Railway Age Gazette* of last week it was stated that the Westinghouse Air Brake Company was reported to have received an order for 1,000,000 shrapnel from France. An officer of the company has said: "We have just closed a contract with representatives of the French government for 1,000,000 three-inch shrapnel shells, cartridge cases and time tubes, for what is known as the 75-millimetre Schneider gun. This gun shoots 16 shots a minute, and is considered one of the most effective implements of war of the French army and navy. The contract aggregates $20,000,000, and we have one year in which to complete it. We are about ready to begin work on the contract, and are completing the installing of machinery in three of our buildings which have heretofore been unoccupied. The shrapnel is in three parts. One part is the steel shell, another the cartridge case and the third the timefuse tube. We will do all the work on the shrapnel except placing in them the explosives. That will be done on the other side of the water. It requires skilled mechanics to manufacture these shells, every part of which must be in perfect order when delivered. We will be able to turn out daily from 3,500 to 5,000 completed shells by working double turn. The contract is enormous, of course, and we are very glad to get it. It means much for the financial condition of this section. We will manufacture only the one-size shrapnel shells for the reason that our present contract will keep us busy for the next 12 months."

Railway Construction

ALMA & JONQUIERES.—The Quebec legislature has granted this company an extension of time in which to build from Herbertville, Que., northwest to Lake St. John, between Great Discharge and Little Discharge, 20 miles; also to build from St. Joseph de Alma easterly to Jonquieres, 30 miles. The company was organized in 1912, and Canon & Parent, Quebec, were the solicitors.

ATHABASCA & FORT VERMILLION.—Incorporated in Alberta with $1,000,000 capital, to build from Athabasca, Alta., northwesterly to Trout Lake and to Fort Vermillion, about 300 miles. J. M. Kernan, J. V. Rawle, A. E. Walsh and J. Dalganeau, Athabasca; S. Clarke, Fort Vermillion, and J. Keith, Edmonton, are interested.

CENTRAL CANADA.—This company, which is building a line from a junction with the Edmonton, Dunvegan & British Columbia at McLennan, near Round lake, Alta., northwesterly to the Peace river crossing has track laid to Paul's, about 30 miles, it is said, and grading on the remaining 22 miles to the Peace river crossing is now under way. J. D. McArthur & Co., Winnipeg, Man., has the contract to build the line. W. R. Smith, Edmonton, Alta., chief engineer. (December 11, p. 1107.)

CHESAPEAKE & OHIO.—A contract has been given to Rinehart & Dennis to build a section of 28 miles of the Chesapeake & Ohio Northern through the Little Scioto valley in Ohio. (April 9, p. 811.)

CHESAPEAKE & OHIO NORTHERN.—See Chesapeake & Ohio.

CURRITUCK & DARE.—A charter has been granted in North Carolina to build a line from the Virginia-North Carolina state line south to a point in Dare county. No work has as yet been done and the company has not yet completed its organization. W. H. Gallop, Jarvisburg, N. C., may be addressed.

EDMONTON, DUNVEGAN & BRITISH COLUMBIA.—This company, which is building from Edmonton, Alta., north and then west via Dunvegan to the western boundary of Alberta, about 415 miles, has been completed to Round lake, 150 miles from the British Columbia boundary, and grading has been finished to Smoky river, an additional 30 miles. Work was started last year on the section from Smoky river to Spirit lake, 65 miles, and surveys were under way from that point west to the British Columbia boundary. The J. D. McArthur Co., Edmonton, Alta., is carrying out the work. (December 4, p. 1067.)

FELLSMERE FARMS COMPANY.—See Fellsmeré Railroad.

FELLSMERE RAILROAD.—An officer of this company, which operates a line from Sebastian, Fla., in St. Lucie county, Fla., south and west to a point west of Fellsmere, 9.94 miles, writes that under the name of the Fellsmere Farms Company, an extension is being built to Broadmoor, 3.5 miles. The track is being laid on a marl fill, made with a dipper dredge through an area of deep muck lands; there will be two trestle bridges over canals on the line. The company expects to develop a traffic in farming produce, etc. (March 26, p. 770.)

GULF, FLORIDA & ALABAMA.—Grading work was resumed recently on the extension building from the present northern terminus at Broughton, Ala., north to Kimbrough, and track laying will be started in about three weks. Work is also under way on a bridge over the Alabama river near Kimbrough, and the company plans to build a new coal pier at Pensacola, Fla. (December 18, p. 1165.)

HURON & NORTHWESTERN.—Articles of incorporation have been filed in South Dakota by this company with a capital of $25,000 and headquarters at Huron. The plans call for building a railway from Huron northeast through the counties of Beadle, Spink, Clark and Day to Roslyn, 105 miles. The incorporators include F. W. Henderson, Summit, S. D.; W. Pelham, Sioux Falls, S. D.; C. E. Wolfe, F. Budack, Wahpeton, N. D., and C. B. Adams, Chicago, Ill. The same interests have also incorporated the Huron Investment & Construction Company, with a capital of $50,000.

ILLINOIS CENTRAL.—This company has awarded a contract for

200,000 cu. yds. of filling required on trestle work on the Indiana division near Bloomfield, Ind., to H. W. Nelson, Chicago.

Kent Coal & Railway Company.—Application has been made in New Brunswick for incorporation to build a railway from Rexton, N. B., southwest to a point on the Intercolonial between Kent Junction and Adamsville, thence via Chipman to Minto, about 80 miles; also to build from Rexton to Richibucto Head. Inches & Hazen, solicitors, Fredericton, N. B.

Kentucky Roads.—Construction work on the line from Barbourville, Ky., north to Manchester, about 25 miles, will be started in May, it is said, and it is expected that the work will be finished and the line put in operation this coming autumn. C. L. Heidrick, Brooksville, Pa., will make the surveys, and E. W. Gerheart, Traders bank building, Scranton, Pa., is said to be interested. (April 2, p. 767.)

New York Subways.—The New York Public Service Commission, First district, has awarded the contract for the construction of Section No. 4 of Routes Nos. 4 and 36 to the Litchfield Construction Company, the lowest bidder at $1,937,509. This section is a part of the Broadway subway in the borough of Manhattan in Seventh avenue, between Fifty-first and Fifty-ninth streets. (April 16, p. 871.)

Ontario Roads Electric.—The Ontario legislature has passed acts authorizing the Hydro-Electric Power Commission of Ontario to investigate, report on, construct and operate electric railways under certain conditions, and some 300 municipalities have asked for surveys and reports on the feasibility of constructing lines through their districts. The commission has made preliminary surveys on about 1,500 miles of line chiefly in southwestern Ontario and expects to issue reports to the municipalities in the near future. A report on the construction of a 100-mile line in the district immediately north and east of the city of Toronto has been made, and the ratepayers in 11 municipalities have passed by-laws and their councils have signed contracts with the commission asking for the construction of a line about 80 miles long through this district. This work will probably not be started until the government has announced whether or not it will grant subsidies to these railways, and until the city of Toronto has arranged for a satisfactory entrance to the heart of the city. The city officers of Toronto are now working on this proposition. Frederick A. Gaby, Toronto, is chief engineer of the Hydro-Electric Power Commission.

Smoky Valley & Peace River.—The Alberta legislature has been asked for a charter by this company to build from the Canadian Northern near the junction of Solomon creek and the Athabasca river in Alberta, northerly and westerly to the junction of Sheep creek with Smoky river, thence north through the Peace river country to a junction with the Canadian Northern Western near Dunvegan. Short, Woods, Biggar & Collisson, Edmonton, Alta., are solicitors for applicant.

Texas Roads.—Surveys are now being made, it is said, for building a line from Marfa, Tex., on the Southern Pacific north via Fort Davis to Toyahvale, on the Pecos Valley Southern, about 55 miles. B. Q. Musgraves, of Fort Worth, and associates are said to be making the surveys.

RAILWAY STRUCTURES

Chicago, Ill.—The Illinois Central has just awarded a contract for the concrete work for its new viaduct over Seventy-ninth street, to the Bates & Rogers Construction Company, Chicago. A contract for 100,000 cu. yds. of grading in connection with this improvement was awarded to J. D. Lynch, Monmouth, Ill.

The Pennsylvania Lines have awarded a contract for the foundation work on the new freight terminal which they will build in Chicago.

Hamilton, Ohio.—The Cincinnati, Hamilton & Dayton is contemplating the erection of a four-stall engine house at this point.

Pensacola, Fla.—See Gulf, Florida & Alabama, under Railway Construction.

Washington.—The Great Northern has awarded a contract to Henry & McFee, Seattle, Wash., for the construction of 1,500 ft. of snow shed on the west slope of the Cascades between Tye and Embryo. The estimated cost of the work is $225,000.

Railway Financial News

Boston & Maine.—The lower branch of the New Hampshire state legislature has rejected a bill providing for the relief of the Boston & Maine as suggested by the joint state public service commissions of New Hampshire, Massachusetts and Maine. The Springfield Republican says that representatives of the Boston & Maine have decided to abandon all efforts to obtain from the present legislature any enabling act for the reorganization of the road. Both House and Senate had previously passed an amended so-called Eastman bill providing for the incorporation of the New Hampshire subsidiaries of the Boston & Maine in the event of the failure of the Boston & Maine reorganization plan. This bill is awaiting the signature or veto of the governor. The legislature voted to adjourn on Wednesday.

Chicago, Rock Island & Pacific.—See an account of the receivership in another column of this issue and also editorial comments thereon.

Indiana Harbor Belt.—This company in the fiscal year ended December 31, 1914, had operating revenues of $3,329,172, an increase of $25,263 over 1913. Its operating expenses of $2,401,613 were $98,686 less than in the previous year, so that the net operating revenue was $124,049 greater. The gross income was $116,813 greater. The deductions from gross income, however, totalling $1,282,076, were $232,082 greater than in 1913, so that there was a deficit for the year's operations of $347,890 as against a deficit of $232,621 in 1913. The stock of the Indiana Harbor Belt is owned 30 per cent by the New York Central, 30 per cent by the Michigan Central, 20 per cent by the Chicago, Milwaukee & St. Paul, and 20 per cent by the Chicago & North Western. The road operates a total mileage of 110 miles in the Chicago switching district. Of this, 45 miles is main line and branches, 27 miles is operated under contract, and 37 miles under trackage rights, there having been an increase of five miles in 1914 because of addition trackage rights secured in the Union Stock Yards district.

The increase in operating revenue above noted was due primarily to an increase in l. c. l. traffic brought about by the partial opening of Gibson Transfer on January 22. The decrease in operating revenue includes a decrease of $54,057 in transportation expenses made possible by improved terminal facilities at Norpaul and Blue Island, and by the use of heavier and more efficient locomotives. The company was required to pay $172,360 more in hire of freight cars because of the abolition, effective January 1, of the intermediate per diem reclaim, and the placing of the cars of the company's proprietary lines on the per diem instead of the mileage basis, effective April 1. There was also an increase of $54,801 in interest on unfunded debt made necessary by additional advances by proprietary lines amounting to $620,000 for working funds and construction expenditures.

In 1914 the company derived earnings from switching service of $3,210,904. The total number of revenue earning cars handled was 749,346, as against 667,857 in 1913, there having been an increase of 26,909 loaded interchange cars, an increase of 85,657 empty interchange cars and a decrease of 31,077 cars received from industries. The average receipts per car were $4.285, as against $4.736 in 1913 and the switching revenue per mile of road was $29,852, as against $30,165 in the previous fiscal year.

Nashville, Chattanooga & St. Louis.—James H. Crichlow, of Murfreesboro, Tenn., has been elected a director, succeeding Colonel N. C. Collier, deceased.

New York Central.—Stockholders have ratified the resolution of the directors authorizing the issue of $100,000,000 20-year 6 per cent convertible debenture bonds and an increase of $100,000,000 in the capital stock to provide for the conversion of the bonds. These are the debenture bonds which were recently sold by the Morgan syndicate.

[ADVERTISEMENT]

ANNUAL REPORT

THE DELAWARE AND HUDSON COMPANY—EIGHTY-FIFTH ANNUAL REPORT

GENERAL OFFICE.

NEW YORK, N. Y., April 12, 1915.

To the Stockholders of
The Delaware and Hudson Company:

The President and the Board of Managers submit the following statements of the affairs of the Company for the year ended December 31, 1914:

The results from operation of the Coal Mining Department were:

Year.	Coal Mined.	†Revenues.	‡Expenses.	Net Revenue.
1914	7,400,695 tons	$15,517,041.94	$14,553,052.94	$963,989.00
1913	7,170,553 "	16,045,308.03	14,748,615.71	1,296,692.32
Decrease	*230,142 tons	$528,266.09	$195,562.77	$332,703.32

† Excluding dividends received from stock of Coal Companies owned.
‡ Excluding taxes.
* Increase.

The results from operation of the Railroad Department were:

Year.	Miles Operated.	Operating Revenues.	‡Operating Expenses.	Net Operating Revenues.	Percentage of Expenses to Revenues.
1914	903.99	$22,595,028.50	$15,048,452.04	$7,546,576.46	66.60
1913	903.99	24,153,494.73	15,210,306.85	8,943,187.88	62.97
Decrease.		$1,558,466.23	$161,854.81	$1,396,611.42	*3.63

‡ Excluding taxes.
* Increase.

RAILROAD DEPARTMENT.

REVENUES AND EXPENSES.

The general distribution of the Operating Revenues and of the Operating Expenses of the Railroad Department was as follows:

	1914.	1913.	Increase or Decrease.
REVENUES:			
From Coal Freight Traffic...	$10,844,092.56	$11,436,959.90	—$592,867.34
" Merchandise Freight Traffic (including switching)	8,153,085.76	8,794,428.57	—641,342.81
" Passenger Traffic	2,946,665.48	3,277,928.68	—331,263.20
" Express Traffic	324,725.08	334,279.74	—9,554.66
" Transportation of Mails	137,374.27	121,793.50	15,580.77
" Miscellaneous Sources..	189,085.35	188,104.34	981.01
Total Operating Revenues	$22,595,028.50	$24,153,494.73	—$1,558,466.23
EXPENSES:			
For Maintenance of Way and Structures	$1,670,364.05	$1,787,613.86	—$117,249.81
" Maintenance of Equipment	3,649,672.52	3,753,963.16	—104,290.64
" Traffic Expenses	314,327.01	305,965.69	8,361.32
" Transportation Expenses	8,602,635.57	8,584,722.10	17,913.47
" General Expenses	811,452.89	778,042.04	33,410.85
Total Operating Expenses	$15,048,452.04	$15,210,306.85	—$161,854.81
Net Revenue from Operation..	$7,546,576.46	$8,943,187.88	—$1,396,611.42
Percentage of Expenses to Revenues	66.60%	62.97%	3.63%

GENERAL INCOME ACCOUNT OF THE DELAWARE AND HUDSON COMPANY, YEAR ENDED DECEMBER 31, 1914, IN COMPARISON WITH YEAR ENDED DECEMBER 31, 1913.

	1914.	1913.	Increase or Decrease.
COAL MINING DEPARTMENT:			
Gross Revenues	$15,517,041.94	$16,045,308.03	—$528,266.09
Gross Expenses	14,553,052.94	14,748,615.71	—195,562.77
Net Revenues	$963,989.00	$1,296,692.32	—$332,703.32
Taxes Accrued	323,102.21	495,000.00	—171,897.79
Operating Income	$640,886.79	$801,692.32	—$160,805.53
OTHER INCOME:			
Dividends and Interest.....	717,068.64	386,733.52	330,335.12
Gross Income, Coal Department	$1,357,955.43	$1,188,425.84	$169,529.59
RAILROAD DEPARTMENT:			
Gross Operating Revenues...	$22,595,028.50	$24,153,494.73	—$1,558,466.23
Gross Operating Expenses...	15,048,452.04	15,210,306.85	—161,854.81
Net Operating Revenues.....	$7,546,576.46	$8,943,187.88	—$1,396.611.42
Taxes Accrued	671,119.13	623,107.27	48,011.86
Operating Income	$6,875,457.33	$8,320,080.61	—$1,444,623.28
OTHER INCOME:			
Hire of Equipment.....	$70,987.13	$213,752.30	—$142,765.17
Outside Operations .....Loss	15,147.45	Loss 26,667.42	Loss 11,519.97
Dividends and Interest.....	1,006,156.29	1,121,996.84	—115,840.55
Miscellaneous Items	41,615.01	54,322.20	—12,707.19
Total Other Income.....	$1,103,610.98	$1,363,403.92	—$259,792.94
Gross Income Railroad Department	$7,979,068.31	$9,683,484.53	—$1,704,416.22
DEDUCTIONS FROM INCOME:			
Rentals	$1,997,770.87	$2,020,228.43	—$22,457.56
Interest on 1st and Refunding Mortgage Bonds (1943)...	1,223,434.99	1,108,160.00	115,274.99
Interest on 1st Mtge. Bonds (1917)	350,000.00	350,000.00	.....
Interest on Debenture Bonds (1916)	558,920.00	558,920.00	.....
Interest on 1st Lien Equipment Bonds (1922).....	433,935.00	435,038.63	—1,103.63
Interest on Debenture Bonds (1914)	.....	4,000.00	—4,000.00
Interest on Divisional Bonds.	75,000.00	75,000.00	.....
General Interest and Discount	170,480.92	205,160.92	—34,680.00
Total Deductions	$4,809,541.78	$4,756,507.98	$53,033.80
Net Income Railroad Department	$3,169,526.53	$4,926,976.55	—$1,757,450.02
GENERAL:			
Miscellaneous Income:			
Dividends and Interest on Securities Owned	$13,516.00	$13,516.00	.....
Rentals, Real Estate.....	25,895.51	37,844.21	—$11,948.70
General Interest and Discount	50,703.42	16,634.56	34,068.86
Total Income	$90,114.93	$67,994.77	$22,120.16
Taxes Accrued	9,734.33	8,661.56	1,072.77
Net Income General.....	$80,380.60	$59,333.21	$21,047.39
Net Income Carried to General Profit and Loss	$4,607,862.56	$6,174,735.60	—$1,566,873.04
	10.84% on	14.53% on	
Percentage to Capital Stock....	$42,503,000.00	$42,503,000.00	.....

FINANCIAL.

CAPITAL STOCK AND FUNDED DEBT.

The Capital Stock of The Delaware and Hudson Company on December 31, 1914, was $42,503,000; no additional shares were issued during the year.

The Debentures of 1914, originally amounting to $2,500,000, have been reduced by payments of $200,000 per annum, and were completely retired on January 1, 1914, by the payment of $100,000.

The Public Service Commission, of New York, Second District, on October 9, 1913, as stated in the Annual Report for 1913, authorized the issue of $4,500,000, First and Refunding Mortgage Gold Bonds, at 95 or better, this Company having applied, on March 26, 1913, for authority to issue $5,000,000. The full amount thus authorized was sold early in 1914, at 95. The proceeds amounted to $4,275,000, of which $2,685,000 was applied, as hereinafter noted, to reduction of Floating Debt; and the remainder, $1,590,000, in accordance with the application to and authority from the Commission, to expenditures which were, at the date of the application, yet to be made for specific additions and betterments then in progress. Accordingly, the latter amount was deposited with the Farmers' Loan and Trust Company as Trustee. Expenditures amounting to $627,646.02 out of this fund have been made and the deposit correspondingly reduced. The application is still under consideration, by the Commission, as to the $500,000 not yet authorized.

FLOATING DEBT.

The Floating Debt of the Company was $3,018,533.51 on December 31, 1914, a decrease of $1,481,466.49 during the year. The amount on December 31, 1913, $4,500,000, was reduced to $1,815,000 by the proceeds from $2,827,000 First and Refunding Mortgage Bonds, that portion of the issue of $4,500,000, previously referred to applicable to expenditures prior to 1914. Subsequently, this debt was increased $1,203,533.51, in part to finance, temporarily, additions and betterments and in part for advances to subsidiary companies (principally the Wilkes-Barre Connecting Railroad Company), which will hereafter be repaid.

SINKING FUNDS.

There was paid during the year to the Trustee under the First and Refunding Mortgage the sum of $311,440, being one per cent of the par value of the First and Refunding Mortgage Gold Bonds outstanding on June 1, 1914, making the total paid to December 31, 1914, $1,484,990. In accordance with the terms of the trust agreement, this sum has been expended in additions and betterments to the property covered by the mortgage.

A summary of the operations of the Sinking Fund under the First Lien Equipment Trust Indenture, from the date of its creation to December 31, 1914, follows:

RECEIPTS:		
Annual payments to Trustee, years 1908 to 1914, both inclusive, at $650,000 per year..	$4,550,000.00	
Interest on cash balances and investments..	256,730.05	
Total receipts		$4,806,730.05

DISBURSEMENTS:

Equipment acquired as follows:		
One hundred and two locomotives	$2,433,460.28	
Five milk cars	15,217.82	
One gas electric car	25,217.46	
One Pintsch gas transport car	2,319.78	
Two gasoline tank cars	1,944.45	
One bridge-erecting car and trailer	14,534.62	
One steam wrecking crane	14,002.90	
One snowplow	5,040.42	
Twenty-two cabooses	23,034.42	
Total equipment		$2,534,772.15
Three hundred fifty-seven (357) The Delaware and Hudson Company First Lien Equipment Bonds of 1922 purchased and retired (including accrued interest)	362,896.77	
Securities and cash in hands of Trustee	1,909,061.13	
Total disbursements		$4,806,730.05

In accordance with the ordinance passed on May 9, 1899, and amended on May 10, 1910, $200,769.51 has been accumulated during the year in the Coal Department Sinking Fund. This has been applied to the purchase of coal lands in the Wyoming region and to the reimbursement of the Treasury for advances to The Schuylkill Coal and Iron Company and the Shanferoke Coal Company for the acquisition of similar lands in the Schuylkill region.

DIVIDENDS.

On December 31, 1914, a dividend for the year 1915, upon the outstanding $42,503,000, of Capital Stock of the Company, at the rate of nine (9) per cent upon the par value thereof, amounting in the aggregate to $3,825,270, was declared, out of the earnings of the current and preceding years, payable as follows:

Two and one-quarter (2¼) per cent upon the Capital Stock, in favor only of stockholders of record on February 25, 1915, and payable on March 20, 1915.

Two and one-quarter (2¼) per cent upon the Capital Stock, in favor only of stockholders of record on May 29, 1915, and payable on June 21, 1915.

Two and one-quarter (2¼) per cent upon the Capital Stock, in favor only of stockholders of record on August 28, 1915, and payable on September 20, 1915.

Two and one-quarter (2¼) per cent upon the Capital Stock, in favor only of stockholders of record on November 27, 1915, and payable on December 20, 1915.

COAL MINING DEPARTMENT.

During 1914, this Company mined 7,400,695 long tons of anthracite, out of a total of 68,342,601, including output of washeries, produced in the region. This is 230,142 long tons more than in 1913, notwithstanding that early in 1914 severe storms interfered with operations to the extent of about 200,000 tons reduction of output. The number of breaker hours worked was 46,159, a decrease of 193.

During 1914, five separate strikes caused temporary idleness at one or more collieries, the total loss being equivalent to closing one colliery for 42 hours or 4 6/9 working days of nine hours each. This compares with 54 5/9 working days of nine hours each in 1913. The idle time in both years would have been avoided had the employees continued at work and permitted the differences to be adjusted in the orderly manner provided by agreement.

In the report for last year reference was made to the tax of 2½ per cent of the value of anthracite when prepared for market, imposed on and after June 28, 1913, by the State of Pennsylvania. The legality of this tax is now before the courts for determination.

A new washery was completed and placed in operation, to reclaim coal from the culm bank at Marvine Colliery in the northern part of Scranton. The work of connecting the underground operations of Plymouth No. 2 with Plymouth No. 5 has been completed and it is intended to abandon Plymouth No. 2 breaker and handle all the output through Plymouth No. 5. An electric plant at Olyphant Colliery, Olyphant, Pa., has been erected, and furnishes light to five collieries located at Scranton and Olyphant and a portion of the power required at Olyphant and Eddy Creek collieries, located at Olyphant, and Marvine Colliery, at Scranton. Additions are contemplated which will enable it to furnish power to other collieries in the same vicinity.

Development work was continued and facilities increased during the year, in order to maintain the output.

The charges therefor, to Extraordinary Expenses of the Coal Mining Department, amounted to $782,644.57 as against $970,535,80, in 1913, as follows:

STATEMENT SHOWING AMOUNTS EXPENDED ACCOUNT EXTRAORDINARY EXPENSES YEAR 1914.

Sinking shafts and shaft improvements	$36,390.19
Tunnels and new openings	130,812.98
New engines, new boilers, boiler houses and fittings	103,093.79
Rope haulage, slopes, planes and ropes	41,120.15
Concrete barns, etc	2,427.70
New pumps and new pump rooms	53,068.78
Electric plants and machinery	240,969.44
Other new buildings	31,097.22
Conveyors	30,143.91
Improvements to breakers and washeries	41,516.18
Miscellaneous	72,004.23
Total	$782,644.57

RAILROAD DEPARTMENT.

OPERATING REVENUES.

The decrease in operating Revenues, as compared with 1913, was $1,558,466.23. The revenue from Coal traffic decreased $592,867.34; the revenue from Merchandise traffic decreased $641,342.81; the revenue from Passenger traffic decreased $331,263.20; and the revenue from Miscellaneous sources increased $7,007.12.

OPERATING EXPENSES.

The decrease in Operating Expenses, as compared with the year 1913, was $161,854.81. Maintenance of Way and Structures Expenses decreased $117,249.81; Maintenance of Equipment Expenses decreased $104,290.64; Traffic Expenses increased $8,361.32; Transportation Expenses increased $17,913.47, and General Expenses increased $33,410.85.

The ratio of Operating Expenses to Operating Revenues in 1914 was 66.60 per cent and compares with 62.97 in 1913.

CAUSES AFFECTING INCOME.

The report for 1913 contains a statement of the causes then adversely affecting railway revenues and enhancing railway expenses. Many of these causes had then recently been accentuated and estimates of their effect upon an whole year's operations were given. Experience has demonstrated that these estimates were not excessive. All these causes were in full force during the year 1914. Moreover, the whole period was characterized by severe depression in the general business of the country and, in the territory occupied by your lines, the weather conditions of the early months of the year were exceptionally adverse, the cost of removing snow and ice being approximately $83,000 greater than the previous year.

The increase in Transportation Expenses of $17,913.47, in the face of a considerable decline in traffic, is a direct consequence of the conditions explained in last year's report, and which are not within the control of the management.

The so-called Full Crew law of the State of New York was in operation during the entire year, as compared with but four months in 1913, and resulted in an increase in expenses of $77,080.33. During the whole year this statute added $117,790.83 to the Transportation Expenses of the Company. The total cost of compliance with the law, since it became effective on September 1, 1913, to the end of 1914, was $158,501.33. The cost for eleven roads, including the principal lines in New York, during the first year that this law was in force was $1,149,843.90. In view of this wholly unnecessary expense which does not in the slightest measure contribute to safety, the Presidents of the railways affected have presented to the Governor and the Legislature a petition for repeal. Three bills, with that object in view, are pending. The cost of compliance with the so-called Full Crew law of Pennsylvania aggregated $37,351.79, as compared with $40,194.49 for 1913. It is significant that the people of Missouri by a referendum vote, recently defeated a similar Full Crew law by 324,085 votes against it to only 159,593 in its favor. Attempts to enact similar statutes have failed in the legislatures of Colorado, Delaware, Virginia and Ohio and have been vetoed by Governor Foss of Massachusetts and Governor Cruce of Oklahoma. A proposed statute of the same character was referred to the Railroad Commission of Connecticut by the State Assembly and the former, in a very strong opinion, condemned it both as to its theory and its consequences if enacted.

In the Report for 1913, reference was made to awards of arbitrators granting increases in rates of pay and modified working conditions to locomotive engineers, effective on May 1, 1912; to locomotive firemen, effective on May 1, 1913, and to conductors and trainmen, effective on October 1, 1913. As the outcome of long negotiations with the engineers and firemen, relative to the meaning and application of the awards, the Operating Expenses of 1914 include further allowance to them of $23,495.28, on account of services performed in 1912 and 1913, which is in addition to the increases in expenses for those years stated in former annual reports. The award to the firemen, in effect during eight months of 1913 and the entire year 1914, resulted in a comparative increase in expenses of $11,666.12. The award to the conductors and trainmen, in effect during three months of 1913 and the entire year 1914, resulted in a comparative increase in expenses of $100,810.10. Increases in rates of pay were also granted to other classes of employees.

The increases shown under General Expenses were caused chiefly by the demands occasioned by the important cases before the Interstate Commerce Commission, by required compilations of special information desired by that body and by work undertaken in connection with the Federal Valuation of railway property.

RAILWAY MAIL PAY.

The conditions under which the mails are carried over the lines of this system continued to be unsatisfactory, as they are generally throughout the United States. The injustice of grossly inadequate returns for these services has lately been accentuated by the extension of the parcel post, on January 1, 1914, to include fifty pound packages within the first two zones and twenty pounds for longer distances. This increase in the weights carried was not accompanied by any increase in the payments to the railways although it has resulted in diverting to the mails a large quantity of express traffic for which the railways were formerly compensated, under their contracts with the express companies, and has, in a smaller degree, even encroached upon the freight movement. Under the system of payment now in force the payments for the several mail routes operated by this Company were fixed, against its protest, for a period of four years beginning with July 1, 1913, in accordance with a weighing conducted during the early months of 1913. As the parcel post was then just inaugurated, had had little time for development, and the maximum weight carried was eleven pounds, it follows that, unless the law is changed, this Company will carry the parcel post mail until July 1, 1917, practically without compensation.

No action in rectification of railway mail pay has been taken by Congress. The Joint Congressional Committee on Railway Mail Pay, of which former Senator Bourne is Chairman, after an investigation which lasted two years, recommended a new basis of payment which it stated would add approximately $3,000,000 per year to the mail pay of the railways, and the Committee said:

"We believe our suggested rates are certainly not too high from a governmental standpoint, though they may be too low from a railroad standpoint."

The Joint Committee also sustained the objections of the railways to quadrennial weighings, to free messenger service and to free compartment cars for mail purposes. Notwithstanding these facts, the House of Representatives added a "rider" to the measure containing appropriations for the postal service which, if it had become a law, would have very materially reduced the mail pay, that the Joint Committee had reported was already too low. Fortuntely the "rider" was not accepted by the Senate.

In 1907, by an arbitrary executive act which reversed the practice of forty years, the divisor used to determine the "average daily weight" which is the basis of mail pay on every railway was increased from 90 to 105, thus reducing the resulting averages and greatly reducing the mail pay of all companies. In a decision rendered on May 18, 1914, in Chicago & Alton Railroad vs. United States, the Court of Claims of the United States decided that this change was one which the Postmaster General had authority to make. Appeal from this decision is now pending in the Supreme Court. The steps necessary to protect the interests of this Company, in case the principle of law involved should be determined favorably to the railroads, have been taken.

INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission's inquiry concerning rates, rules, regulations and practices in the transportation of Anthracite, begun in 1912, continued throughout the year. Taking testimony was concluded in October, and briefs were filed and arguments heard during January, 1915. No decision has yet been announced. In the advanced rate case, hereinafter referred to, the Commission recognized the contention that th investment in property devoted to public use, rather than the par value of stocks and bonds, must be the proper basis for computations intended to test the reasonableness of the returns derived from the services rendered. This is obviously sound as earnings result from the use of assets, earning power is that which gives value to assets. Property devoted to public use constitutes assets and should therefore be the basis of all computations concerning returns. Stock and bonds are liabilities. For the purposes of this inquiry the property accounts were restated, as far as possible, so as to bring them into conformity with the present accounting system prescribed by the Interstate Commerce Commission, and among the most significant facts developed in connection with the anthracite inquiry was that the combined net operating income (that is, the balance left from gross receipts after paying operating expenses and taxes) of all the railways serving the Anthracite region, for the year that ended with June 30, 1914, amounted to only 5.06 per cent of the cost of their property devoted to public use. Since the creation of the Commission there have been only nine years in which this ratio has exceeded seven per cent, while in nine years it fell below six per cent, and in two years it was only slightly above four per cent. This rate of return upon property is lower than it ought to be in the general public interest.

The Annual Report for 1913 contains a statement of the conditions which led this Company to participate in the general five per cent advance in freight rates which was then under suspension by the Interstate Commerce Commission. The effort to obtain a partial readjustment of tariff rates, in view of the added cost of producing railway services, has at last been sanctioned, as to some of the changes attempted, by a majority of the Commission. A majority of the Commission at first opposed most of the changes, and an order, cancelling the new tariffs, was issued, over the dissent of two Commissioners, on July 29, 1914. Nevertheless, at that time the Commission said:

"In view of a tendency towards a diminishing net operating income as shown by the facts described we are of opinion that the net operating income of the railroads in official classification territory, taken as a whole, is smaller than is demanded in the interest of both the general public and the railroads; and it is our duty and our purpose to aid, as far as we legally may, in the solution of the problem as to the course that the carriers may pursue to meet the situation." *31 I. C. C., pp. 351-384.*

This proceeding was reopened by an order of the Commission, entered on September 19, 1914, and further hearings were granted, at which the carriers produced testimony covering their operations during the period subsequent to the former closing of the case, on May 29, 1914. and relating to the financial consequences of the European war. Concerning these data, the Commission said:

"These figures serve to emphasize our previous finding of the needs of carriers in official classification territory, taken as a whole, for increased net revenue." *32 I. C. C., pp. 325-327.*

The majority of the Commission concluded that these conditions justified the proposed advances on all freight traffic except (1) rail and lake traffic, (2) bituminous coal and coke, (3) anthracite and iron ore, and (4) rates controlled by unexpired orders of the Commission. The commodities thus excluded form a very substantial part of the traffic carried by The Delaware and Hudson Company. Estimates based on the traffic handled during the year that ended with October, 1914, excluding state traffic to which the action of the Interstate Commerce Commission does not directly apply, show that in 1914, $13,851,634 of a total revenue of $18,941,192 came from the excepted classes, leaving $5,089,558 with reference to which rates have been advanced. Assuming that the increase is exactly five per cent, the additional revenue accruing to this Company would be $254,478. This is equivalent to about one-fourth of one per cent on the total cash invested in its property devoted to public use. A subsequent order of the Commission, in recognition of the relationship of the rates to and from various points and districts, gave permission to increase certain rates a trifle more than five per cent where necessary to preserve the relationships of the existing rate structure. This, however, will not substantially increase the additional revenue produced by the advance. The tariffs providing for the advance on interstate traffic became effective on January 15 and February 23, 1915.

In its opinion of July 29, 1914, rendered in connection with the original order cancelling the proposed advances, the Commission recommended to the carriers certain expedients for increasing net revenues. Effort to apply these suggestions has been made and has in some instances resulted in adverse action by state authorities. So far as they are applicable to this Company, however, it is estimated that, including the increase in the price of mileage tickets from two to two and one-quarter cents per mile and the withdrawal of round-trip passenger rates, already in effect, they can be made to produce approximately $130,000 per annum or about one-eighth of one per cent upon the property of this System devoted to public use.

The Federal valuation of railways in charge of the Interstate Commerce Commission is proceeding slowly and the great difficulties and tremendous expense, both to the Government and to the railways, are becoming increasingly apparent. The estimates given to the Committee on Appropriations of the House of Representatives by the Director of Valuations, in charge of the work of the Commission, indicates a cost to the Government of from $18,000,000 to $21,000,000 and a minimum time for the completion of the task of not less than four years from July 1, 1915. The same authority indicates a cost to the railways greatly in excess of the cost to the Government. He advised the Committee that a particular road "which is poor and cannot afford it, has been obliged to do a great deal of work and is laying out a great deal of money," actually spending, for the purposes of the valuation, at the rate of "one hundred dollars a mile." The estimates given when legislation providing for this work was pending were about one-eighth of the amount which is now admitted as the expense to the Government alone. It is probable that the work would never have been authorized if Congress had been advised that the cost would even approximate the amounts that are now certain to be required. A Presidents' Conference Committee, a Committee of Engineers, and a Committee on Financial History and Accounts have been organized by the railways and are co-operating satisfactorily with the Valuation Board established by the Commission. The latter has completed inventories of four roads, none of them of the largest, but valuations have not yet been placed upon the different units of the property embraced, much less upon any of these railways as an entirety. This Company has found it desirable to undertake an examination of the records of its long existence and a considerable amount of field work in order to protect its interests in the valuation. This work is progressing satisfactorily.

ADDITIONS AND BETTERMENTS.

Renewing and strengthening bridges on the main lines to make them capable of carrying Class E-5 Consolidation Engines, as mentioned in the annual reports for 1912 and 1913, continued through 1914, resulting in charges of $73,929.94 to Additions and Betterments, and of $51,945.42 to Operating Expenses. About ninety per cent of this program was completed, and it will be fully completed in 1915. Strengthening bridges between Saratoga Springs and North Creek, to make them capable of carrying engines of Class E to E-3 inclusive, undertaken in 1913, as mentioned in the report for that year, was completed in 1914. Improving and lengthening the bridge carrying the Troy road and tracks of the United Traction Company over the tracks of this company at Menands, N. Y., to provide increased horizontal and vertical clearances and room for additional main tracks in connection with the reconstruction of the Troy road as a State highway, as mentioned in the report for 1913, was completed in 1914 at a total cost of $74,532.26, of which $31,061.22 was expended during 1914. Of the total cost, $51,950.26 was charged to Additions and Betterments, and $22,582 to Operating Expenses. In connection with the bridge improvement program, it was found necessary to reinforce abutments of Bridge No. 11 at Troy, N. Y.; No. 12 at Voorheesville, N. Y.; No. 42.02 at Barnerville, N. Y.; No. 46.85 at Cobleskill, N. Y.; No. 52.44 at Richmondville, N. Y.; No. 18.64 at Mechanicville, N. Y.; No. 55.28 at Fort Edward, N. Y., and No. 67.13 at Fort Ann, N. Y. There was expended on this work, to December 31, 1914, $62,878.81, of which $43,898.99 was charged to Additions and Betterments, and $18,979.82 to Operating Expenses. The elimination of grade crossing at Bainbridge, N. Y., mentioned in the annual report for 1913, was completed during 1914 at a total cost of $15,669.31, one-half to be borne by The Delaware and Hudson Company, and one-half by the State of New York.

The installation of block signals between Plattsburgh and Rouses Point is in progress, $15,634.88 having been expended during the year. This work will be completed early in 1915. An extensive improvement in the block signal system, consisting of the installation of distant signals at the end of double tracks and for passing tracks leading from single track line, and the extension of overlaps to a minimum distance of 2,000 feet where distant signals are not in use, was undertaken during the year. This was practically complete on December 31, 1914, the expenditures to that date having been $35,514.03, of which $29,950.03 is chargeable to Additions and Betterments and $5,564 to Operating Expenses. A small amount of work remaining to be done on the Champlain Division will be completed early in 1915.

Improvements at Albany, including purchase of additional lands, the erection of general office building and freight terminal, and construction of bulk delivery and freight house tracks, as mentioned in the annual report for 1913, progressed satisfactorily, and will be completed during 1915. To December 31, 1914, $790,026.28 had been expended on these improvements.

Fifteen Class E-5 consolidation locomotives, ten Pacific type Passenger locomotives and seven steel-center-sill, double truck, four wheel cabooses, all paid for from funds accumulated under the First Lien Equipment Trust Indenture, were received during the year.

The program of development of the yards at Carbondale, mentioned in the annual report of 1913, continued during 1914, and $27,543.30 was expended thereon. Construction of tracks to serve the new washery at Providence, Pa., known as Marvine Breaker No. 2, mentioned in the annual report for 1913, continued during the year. There was expended $26,856.33 during 1913, and $16,908.54 during 1914, a total of $43,764.87, all chargeable to Additions and Betterments. The work will be completed in 1915. Addition of four boilers and one blower to the Mechanicville Power Plant, mentioned in the annual report for 1913, was completed in 1914. Increasing the height of the smoke stacks of this power plant by 100 feet, in order to effect fuel economies, was begun and will be completed during 1915. There had been expended to December 31, 1914, $38,185.53, all charged to Additions and Betterments.

The installation of a 50,000-gallon tank at Hudson, Pa., mentioned in the annual report for 1913, was completed during the year. A pumping plant, to furnish an adequate supply of water for the new shops at Colonie, N. Y., was completed early in 1914 at a total cost of $14,256.11, all charged to Additions and Betterments. New and modern track scales were installed at Green Ridge, Pa., during the year to take the place of scales that had become inadequate on account of the increase in capacity of freight cars.

The net changes in the property accounts, on account of Additions and Betterments to the Company's railroad during the year (including expenditures on account of items mentioned above) amounted to $1,820,738.87.

Station and yard improvements, including new passenger station at Ticonderoga, N. Y., undertaken during 1913, as mentioned in the report for that year, were completed during 1914. This work was paid for from accumulations under the operating contract with the Ticonderoga Railroad Company.

Construction of the Wilkes-Barre Connecting Railroad, to connect the Pennsylvania Railroad and the lines of this Company, near Wilkes-Barre, mentioned in the annual reports for 1912 and 1913, progressed rapidly during 1914, and it is expected that the line will be opened for operation early in 1915.

ALLIED STEAM RAILWAYS.

The Greenwich and Johnsonville Railway Company shows a decrease in Operating Revenues for the year 1914 of $14,569.85, as compared with the previous year. The Operating Expenses decreased $6,542.42. The Net Income was $20,140.83, a decrease of $6,162.83. A dividend of six per cent for the year ended June 30, 1914, was declared.

The Quebec, Montreal and Southern Railway Company shows a decrease in Operating Revenues of $8,835.17, as compared with the previous year. The Operating Expenses decreased $16,955.83. Income from Hire of Equipment increased $11,514.33. The Net Income, not allowing for interest due The Delaware and Hudson Company, amounted to $149,051.37, an increase of $19,758.62.

The Napierville Junction Railway Company shows a decrease in Operating Revenues of $14,668.78, as compared with the previous year. Operating Expenses show an increase of $11,816.45. Net Income amounted to $24,858.11 or 4.14 per cent on Capital Stock outstanding, a decrease of $28,015.02, compared with the previous year. A dividend of three per cent for the year ended December 31, 1914, was declared. The Freight Revenue decreased $23,019.77, while Passenger Revenue increased $8,080.19. The latter increase was due to the inauguration of through passenger train service over the Napierville Junction Railway between Montreal and points on The Delaware and Hudson. The increase in expenses was due to increased maintenance charges and increased passenger train service. The cost of maintenance, while higher than the preceding year, was not abnormally high, inasmuch as during the first years of the Company's existence the renewals were naturally relatively small.

ALLIED ELECTRIC RAILWAYS.

Gross Operating Revenues of the United Traction Company decreased $47,271.94; Hudson Valley Railway Company, $43,508.29; Schenectady Railway Company, $89,198.93, and Troy and New England Railway Company, $940.36, while those of the Plattsburgh Traction Company increased $1,832.01. Decreases in Net Operating Revenues were as follows: United Traction Company, $201,379.52; Hudson Valley Railway Company, $48,659.08; Schenectady Railway Company, $92,294.20; Troy and New England Railway Company $634.31, and the Plattsburgh Traction Company $713.74.

The business depression, particularly during the latter part of the year, adversely affected the revenues of all the traction companies, while, at the same time, various causes increased cost of operation. The unusually severe weather in the earlier months of the year very greatly increased the cost of removing snow and ice. The United Traction Company's cost of power is steadily increasing, owing to operation of heavy modern steel cars and inability to purchase the additional power as cheaply as that covered by the first contract. Effective July 1, 1914, various operating employees were granted increases in wages. These increases amounted to about $15,000 for the last six months of the year. Similar increases were granted to employees of the Hudson Valley Railway Company, aggregating approximately, $3,000.

Dividends of two per cent for the year 1914 were declared on the Capital Stock of the United Traction Company; six per cent on that of the Schenectady Railway Company; two and one-half per cent on that of the Troy & New England Railway Company, and four per cent on that of the Plattsburgh Traction Company.

The Hudson Valley Railway Company, after years of continued effort, has secured the right to cross Broadway in the Village of Saratoga, which will enable it to install a belt line service in Saratoga and to materially improve the through service between Albany and Glens Falls. A new concrete viaduct has been constructed over the Hudson river, connecting Glens Falls and South Glens Falls. A new bridge over the Barge canal south of Fort Edward has been completed; and the Whitehall bridge in Fort Edward has been raised 2.4 feet, to facilitate traffic on the Barge canal.

The use of heavier cars and the increased frequency of service of the United Traction Company have necessitated the erection of a new sub-station at the corner of Chapel street and Sheridan avenue, Albany, to centralize the power distribution in that city so that delays to traffic may be avoided. This sub-station will have an ultimate capacity of 9,600 K. W., and be completed in the Spring of 1915 at a total estimated cost of $150,000. The transmission system connected with the Twenty-fifth street sub-station, Watervliet, was enlarged during the year by the installation of an additional set of transmission lines to the Mechanicville power plant, a distance of twelve miles, and 3,102 feet of cable to Congress and River streets, Troy, and 6,892 feet of cable to a connection with the line of the Schenectady Railway Company and the installation of one 600 K. W. rotary converter. There were also installed 10,649 feet of cable on Cohoes road, and 5,015 feet on the Cohoes Belt Line. The feeder on Madison avenue, Albany, was extended 4,789 feet.

All equipment was maintained in an efficient condition, but owing to reduced earnings and heavily increased expenses part of the ordinary painting of cars was deferred, and will be undertaken during the year 1915.

On December 11, 1914, the Public Service Commission, Second District, State of New York, issued an order directing the United Traction Company to make changes in its facilities and services in Albany which, if they can lawfully be required, would necessitate capital expenditures that would involve raising $1,106,580.43 and entail material and continuing additions to operating expenses without being productive of any additional revenue. Among other things, the Company was ordered to purchase forty-two additional cars seating forty passengers each; to provide higher powered snow-fighting equipment; to extend its lines in Arbor Hill and New Scotland road; to extend its underground conduit and feeder system, and to provide itself with a private and exclusive telephone system. The Company was also ordered to provide more frequent service on certain lines. In many respects the changes that were ordered are believed not to be in the ultimate interest of the public, but must impair the ability of the Company permanently to render satisfactory service, and the capital expenditures would be excessively burdensome and unreasonable at this time, especially in view of present financial conditions throughout the country and the decreased patronage of these street car lines. The recent capital expenditures of the United Traction Company should be considered in connection with this order. The following shows such expenditures from January 1, 1907, to November 30, 1914, inclusive, together with the amounts still to be expended upon work now in progress, classified according to the principal items.

Item.	Expended.	To Be Expended.	Total.
Engineering	$9,122.23	.....	$9,122.23
Rights of way	15,186.00	.....	15,186.00
New lines and extensions	142,142.59	.....	142,142.59
Roadway and track	383,882.27	$17,782.91	401,665.18
Paving	265,163.93	48,860.37	314,024.30
Bridges	9,000.00	.....	9,000.00
Distribution system	273,251.98	134,846.49	408,098.47
Signal apparatus	7,434.85	.....	7,434.85
Power plant equipment	49,585.04	1,303.06	50,888.10
Cars and electric car equipment	539,742.92	3,517.60	543,260.52
Buildings and fixtures	10,587.59	.....	10,587.59
Shop machinery and tools	10,324.91	.....	10,324.91
Other additions and betterments	72,552.80	.....	72,552.80
Total	$1,787,977.11	$206,310.43	$1,994,287.54

In addition to the expenditures for paving included in the foregoing, paving requirements of the cities of Albany and Troy, if the present plans are carried out, will make necessary a further expenditure of $166,825.60 by this Company.

The capital expenditures required by the order would not be self-sustaining, but instead would cause additional expenses for maintenance and for other operating purposes, while the increased frequency of service required on some lines would cause added expense without bringing in any additional revenue, and this added service is not justified by the patronage at the present time. After the order was entered, application to the Commission for a rehearing was made and denied, although the Company offered proof of the financial conditions, including the changes brought about by the war, and of other matters, arising subsequent to the hearings in July, that were believed to be relevant and important. The Courts have been appealed to in the matter and proceedings under the order have been stayed pending a decision by the Appellate Division.

As compared with 1907, the rates of wages of the conductors and motormen employed by the United Traction Company show an increase of more than twenty-seven per cent, a result of resort to arbitration in settlement of labor difficulties. The pay of other employees has increased proportionately. The total pay-roll for the year 1914 was about $240,000 higher than it would have been except for these increases.

ALLIED BOAT LINES.

The Operating Revenues of The Champlain Transportation Company show a decrease of $16,263.02, and the Operating Expenses show a decrease of $2,431.34, making a decrease in Net Operating Revenue of $13,831.68 for the year. The Operating Revenues of The Lake George Steamboat Company show a decrease of $2,682.86, and the Operating Expenses show a decrease of $3,571.53 as compared with 1913, making an increase in Net Operating Revenues of $888.67 for the year. As the traffic of the boat lines consists largely of those traveling for pleasure, the Season of 1914 was adversely affected by the unfavorable business conditions throughout the country.

LITIGATION.

In the litigation heretofore reported in connection with the contract under which this Company operates the Ticonderoga Railroad, accounting proceedings are pending before a Referee, in conformity with the recent decision of the Court of Appeals.

The action brought against the Company in 1913 by Katherine S. Weld and others for an accounting of royalties under the Henry B. Rockwell coal lease of 1859, is still pending. A new action for an accounting has been begun by William S. Birdsall and others interested in the royalties payable under the coal lease of James Stott made to this Company in 1890. The suit is still pending. The suit for an accounting under the coal lease of William Miles and others to this Company, made in 1880, which was begun in August, 1913, is in course of settlement.

On December 29, 1914, The Rensselaer & Saratoga Railroad Company brought suit against The Delaware and Hudson Company, involving the interpretation of the lease under which the property of the former is operated by this Company. The suit involves the ownership of 8,000 shares of stock of The Rensselaer & Saratoga Railroad Company now carried as a Treasury asset of this Company. The matter is proceeding in regular course and the General Counsel is very hopeful of a decision favorable to this Company.

The Rensselaer & Saratoga Railroad Company claims that under its contract with The Delaware and Hudson Company the latter should pay any income tax which is assessed against the former. The assessment for the ten months ended December 31, 1913, amounted to $6,659.77, of which $533.33 was erroneously assessed, leaving $6,126.44 to be paid. The lower court has decided a suit brought to test this question unfavorably to this Company but appeal was taken and is now pending in the Appellate Division.

GENERAL REMARKS.

On July 1, 1914, the Workmen's Compensation law became effective in the State of New York. It provides for death benefits and compensation to employees during disability due to injuries received in their employment. The extent to which this Company's railway traffic is interstate renders it unlikely that it will be materially affected. Suitable provision has been made by the allied traction lines, hotels and other companies affected, whereby they have become self-insurers, as provided under the Act, having made the required deposits with the Commission as a guarantee of compliance with the Act.

Public attention cannot be too forcibly directed to the increasing difficulties under which the most solvent railways must compete for the capital necessary for their continued development to keep pace with the forward strides of general industry. So far as this competition is with States and Municipalities, it has recently become more intense by reason of the advancing rates offered and the freedom of such investments from the Federal income tax and the inquisitorial features attending its enforcement while, so far as it is with manufacturing or industrial corporations, the same effect has sprung from the longer establishment and enhanced stability of the issuing corporations. The public offerings of State and Municipal bonds, exclusive of those taken for the sinking fund of New York City, increased from $143,590,868 in 1902 to $383,150,828 in 1912, and the aggregate annual issue of such bonds paying four per cent or higher increased during the same period from less than $60,000,000 to substantially $380,000,000. Not only do these issues compete with those of railways for the share of the limited investment fund required by the latter, but the augmented governmental activities that they suggest, tend to increase the general burdens of taxation, of which so disproportionately large a share is invariably imposed upon the railways. It is not surprising, therefore, that from 1902 to 1914, the annual taxes paid by American railways increased from $54,465,437 to $157,371,100. Many, however, may not have realized that in 1914 the various taxing authorities demanded and collected $38.26 out of every $100.00 which the railways had left out of their operating gross receipts after the payment of wages, other operating expenses and interest on indebtedness, as against $15.92 out of every $100.00 in 1902, or that in the later year the railways paid $2.39 in taxes for every dollar which they paid twelve years earlier. Especially in view of the drain upon the World's resources that is attending the great European war and that is likely to continue long after that war has closed, these facts ought to receive earnest thought. They indicate a great necessity and a great opportunity for unselfish, unprejudiced and constructive statesmanship.

By order of the Board of Managers,

L. F. LOREE,
President.